

“The Impact of prospect biases on stock market investment decision of individual investors in Indian stock market”

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Abstract

The stock market of India consider as one of the most important emerging market in the South Asia, since it has the biggest trading volume among all financial markets in the region, thus the researchers hopes that the results of the study will improve the decisions making of the individual investors through identifying the most important behavioral finance factors, which may affect their decisions when they invest in stocks. Behavioral finance occurs as a result of inefficient markets. Investors that use behavioural finance are more likely to behave irrationally while making decisions. The main objective of this research is to ascertain and empirically demonstrate how mental accounting, regret aversion, and loss aversion behaviour influence investment decisions. An investor's risk perception as an analysis carries a logical rationale for how investors choose when they are faced with multiple investment choices. I used a questionnaire-based survey method to collect sample data of 300 respondents, Research analysis method using ADF, Correlation and Regression. According to the research conducted, the results of mental accounting, loss aversion and regret Aversion have a significant effect on investment decision in Indian stock market.

Keywords: Behavioural finance, cognitive bias, mental accounting, regret aversion, loss aversion, Augmented Dickey-Fuller.

1.1 Introduction :

Throughout the past few decades, financial theories and research have been conducted in an attempt to gain a better understanding of the financial markets by using models that describe investors as "rational." This remark implies that there is some degree of risk and return trade-off in all financial actions, especially those involving stock purchases. Many financial theories assumed that investors had no difficulty making decisions when investing in stocks since they are informed, cautious, and consistent.

Two of the most important financial theories were the Capital Asset Pricing Model (CAPM) and Modern Portfolio Theory, which demonstrated that investors were not confused by the information they received that was not influenced by their behavioural finance variables. Applied research conducted in competent global capital markets have revealed that numerous phenomena related to stock investment decisions remain unexplained. Meanwhile, behavioral finance had been growing specifically because of the fact that investors rarely behave according to the assumptions suggested in these financial theories.

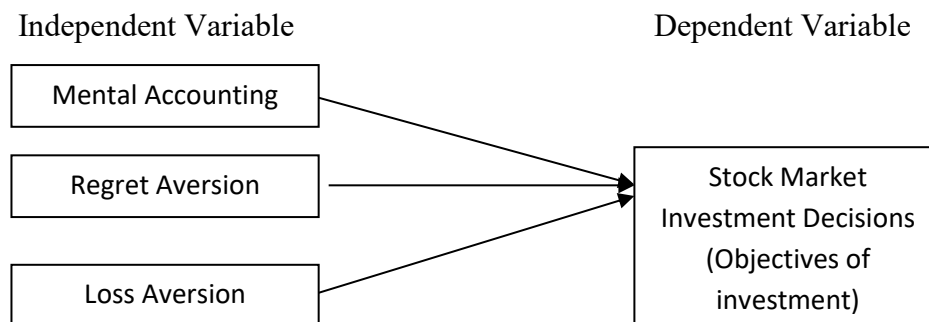
In order to help investors select a better stock investment decision-making policy, the field of behavioral finance aims to better understand and explain how financial behavioral aspects influenced decision-making regarding stock investments. The main objective of this study is to

confirm the significant variables that could influence stock investment decision-making at the Indian Stock Market. The results of applied research had varied in determining which of those variables had the most impact on stock investment decision-making. The following factors have been identified by multiple studies: cognitive biases like heuristic, herd behavior, prospect etc.

Prospect theory

Prospect Theory is a novel behavioural theory that provides stated probabilities and a variety of options about risk-taking behaviour and uncertainty. It was developed by Kahneman and Tversky in 1979. This theory relies on the concept that humans base their judgements on the premise of restricted rationality rather than classical rationality. A key tenet of prospect theory is people assess choices on an individual basis and then use a reference point or anchor to make their choices, rather than within the context of an overall portfolio. Prospect theory is also based on the principle that individuals are loss averse in which they place greater weight on losses than gains. Individuals apply more importance and mental effort to avoiding a loss than to achieving a gain.

1.4 Research Model



1.5 Significance of the Study

The stock market of India consider as one of the most important emerging market in the South Asia, since it has the biggest trading volume among all financial markets in the region, thus the researchers hopes that the results of the study will improve the decisions making of the individual investors through identifying the most important behavioral finance factors, which may affect their decisions when they invest in stocks. The goal of the study is for it to become one of the pioneering local and regional studies in the field of behavioral finance.

- It is beneficial for investors to understand how behavioral financial factors influence stock investment decision-making.
- This study helps to understand the existence of the behavioral biases in the financial decision taken by investors

2. Literature Review Behavioural

According to Sewell (2001), behavioural finance is the study of how psychology affects financial professionals' actions and how that influences markets, which helps to explain why and how markets may be inefficient. According to Kahneman and Tversky's (1974) research, humans depend on a small number of prospect principles rather than statistical methods when making

decisions. The finest explanations for their various eras can be found in the writings of Tversky and Kahneman, who are regarded as the founding fathers of behavioural finance. In 1979, they offered a critique of the theory of Expected Utility. When compared to outcomes that can be achieved with certainty, they have discovered that people have a tendency to undervalue results that are just probable.

Tversky and Kahneman's (1981) illustration of framing effects is the most well-known. From distinct perspectives, prospect theory and expected utility theory (EUT) are regarded as two methods for making decisions. While EUT focusses on investors' rational expectations, prospect theory emphasises investors' subjective decision-making affected by their value system (Filbeck, Hatfield & Horvath, 2005, p. 170–171). In the analysis of risky decision-making, EUT—the normative model of rational choice and descriptive model of economic behavior—dominates.

1.2 Prospect theory

The Theory of Prospects In economic psychology, prospect theory—created by Kahneman and Tversky in 1979—is among the most often cited and well-documented concepts. We have an unreasonable propensity to be less ready to gamble with gains than with losses, according to the hypothesis. Prospect theory, developed by Tvede (1999), demonstrated how people behave in situations involving risk and uncertainty. People are especially prone to certain outcomes, therefore they place greater weight on those that are seen as definite than those that are just plausible. The "certain effect" refers to the fact that people are not always risk adverse; rather, they are risk-takers in losses but risk-averse in winnings (Kishore, 2004).

Prospect theory gives value to gains and losses rather than final assets and substitutes choice weights for likelihood. The theory, which Kahneman and Tversky (1979) validated through experimentation, predicts a distinctive fourfold pattern of risk attitudes: risk aversion for moderate to high probability profits and low probability losses; risk seeking for gains aversion for moderate to high probability profits and low probability losses; and risk seeking for low probability gains and moderate to high probability losses. According to Waweru et al. (2003), prospect theory explains certain mental states that influence a person's decision-making processes, such as regret aversion, loss aversion, and mental accounting.

1.3 Influence of Mental Accounting in Stock Market Investment Decision

Experiments by Amos Tversky and Richard H. Thaler (1990) have shown how mental accounting biases affect portfolio decisions, frequently departing from the expectations of conventional portfolio theory. Mental accounting is a term referring to “the process by which people think about and evaluate their financial transactions” (Barberis & Huang, 2001, p. 1248). Mental accounting allows investors to organize their portfolio into separate accounts (Barberis & Thaler, 2003, Ritter, 2003,). Statman (2004) talked about how mental accounting frames gains and losses within separate mental accounts, which affects risk preferences and asset allocation.

Laboratory experiments by Enrico G. De Giorgi and Thierry Post (2017) offered more proof of how the way money is framed across mental accounts affects risk-taking behaviour and investing results. By integrating mental accounting biases into traditional portfolio frameworks, Utpal Bhattacharya and Neal Galpin (2011) developed a model that clarified the ways in which these biases impact asset allocation and realisation decisions. When taken as a whole, these studies

indicate how mental accounting affects risk decisions, asset allocation, and overall portfolio management.

According to the findings of a study by Santo et al. (2019), which examined the influence of mental accounting on equity investment decisions, investors who experience this phenomenon allocate a larger portion of their funds to investments, giving monthly private funds a higher priority than bonus funds, and they are more terrified of the risk associated with investing in monthly private funds than bonus funds. According to the study's findings, financial market investors exhibit a bias in favour of mental accounting.

Obademi and Ogunlusi's (2021), The study's findings, which explored the influence of behavioural finance on investment decision-making, showed that financing decisions and behavioural investment decisions had a positive relationship, and that there was a significant relationship between the decision of an individual investment and the potential client. The study also found a strong and negative relationship between investment decisions and probability theory and inference theory. The study recommended that investors be made aware of the fact that there are a number of behavioural factors that can influence their investment decision-making process, including inference theory and probability theory.

The study by Mascareñas and Yan (2017) explored the thought of mental accounting, which combines psychology and finance, and proposed that investors' expectations should guide the investment portfolio. Not all investors want to take risks in order to make money, and not all investors would give up their profits because they are frightened of taking risks. This study examines the influence of mental accounting on financial and investment decisions among investors 280.

According to a study by Anolam et al. (2015), that examined the impact of mental accounting on business performance and profitability. The study's findings showed that all three aspects of mental accounting—transaction benefit, classification process, and choice between brackets—had a significant impact on the company's profitability.

The research conducted by Bonner et al. (Examined, 2014) The study's findings show that managers of the company think that investors, even in retrospect, avoid losses more than they do. They also show that managers are taking into account other factors that reflect mental accounting, such as the relative size of items on the income list, the classification of income list elements, and consideration of investor slates, such as accountability for profit results or the desire to retain them. Investors will benefit in the future from managers' understanding of these additional factors.

Influence of Regret Aversion in Stock Market Investment Decision

Regret is an emotion occurs after people make mistakes. Investors avoid regret by refusing to sell decreasing shares and willing to sell increasing ones. Furthermore, investors are more likely to regret owning losing stocks for an extended period of time than to regret selling winning equities too quickly (Forgel & Berry, 2006; Lehenkari & Perttunen, 2004).

Regret theory (Loomes and Sugden 1987) is a vital theory of emotional biases in behavioral finance which reflects that investors mostly care about what they could have realized in the past if a different option would have been chosen.

Regret aversion is an emotional bias that is comparatively developed late in any investor. Sometimes, individual investors believe that if they had selected a different course of action when trading, a poor outcome may have been prevented. Malik, I. R., and Shah, I. (2021).

The influence of regret aversion emotional bias on the frequency of trading by Chinese investors was examined by (Deuskar, Pan, et al. 2021). They found that this effect is larger when action is done as opposed to inaction.

The psychological aspect of regret in all forms of decision-making has been thoroughly examined with empirical support in previous studies, and neuroscience also supports the significance of regret in human decision-making (Camille, Coricelli, et al. 2004), Bourgeois-Gironde 2010). Similar to this, previous research has examined the connection between neuroticism and regret and the trading behaviour of individual investors. For instance, if individual investors with high neuroticism invest in portfolios that have specific outcomes that amplify the negative emotions associated with the trait, their attempts to counteract these upsetting stimuli are typically futile and ineffectual (Fung and Durand 2014).

According to Pompian (2011), individual investors fall prey to regret aversion bias and steer clear of investments as a result of either commission or omission errors. Since most investors compare their investments with other investments in their mental state, some individual investors generally exhibit this behaviour in the form of reference-dependent utility (Diecidue and Somasundaram 2017).

Engelbrecht-Wiggans, Haruvy et al. 2007) determined in their study that individual investors do regret in both scenarios i.e., either in stable or even non-stable environments.

According to a comprehensive study on the antecedents of regret aversion bias in PSX (Awais and Estes 2019) The development of emotional biases in Pakistan is largely caused by a lack of analytical skills, mistakes of commission, regret aversion, inappropriate information, and conservatism

Similarly, a recent study by Shah and Malik (2021) found that regret aversion reduces the frequency of trading for individual investors who are registered with the PSX. After doing above mentioned review of relevant literature, the following is hypothesized for its empirical testing. H1: Regret Aversion has a significant negative impact on individual investors' trading frequency in PSX.

Influence of Loss aversion in Stock Market Investment Decision

Influence of Loss aversion in Stock Market Investment Decision, It means that investor is risk seeker when faced with respect of loss, but becomes risk averse when faced with the prospects of enjoying gains. Khaneman has said that investors are "Loss aversion". This 'Loss Aversion' means that people are willing to take more risks to avoid loss than to realize gain. Prospect theory was introduced by Kahneman and Tversky in 1979, defining loss aversion as a major behavioural bias in which, while making decisions in the face of uncertainty, losses become more likely than rewards.

The difference in the mental penalty people experience from a similar size increase or loss is known as loss aversion (Barberis & Huang, 2001, p. 1248). Research indicates that individuals are more concerned about the possibility of losses than they are pleased about comparable benefits (Barberis & Thaler, 2003, p. 1077). The negative correlation between the selling trend and investors' capital losses can be strengthened by both good and negative returns in the past,

according to Lehenkari and Perttunen (2004, p. 116), indicating that investors are loss averse. Although risk aversion is a frequent investor behaviour, it can lead to poor decisions that negatively impact an investor's wealth (Odean, 1998a, p. 1899).

According to Shefrin & Statman (1985), investors keep losing stocks for an extended period of time and sell winning stocks too soon due to the disposition effect, which is driven by loss aversion. Thaler & Johnson (1990) Found that loss aversion's influence on risk-taking is moderated by prior outcomes, leading to path-dependent investment decisions.

Kahneman (1992) showed how loss aversion influences preferences for uncertain outcomes by extending Prospect Theory to incorporate cumulative risk assessments. Wakker & Tversky (1993), Explored the nonlinear weighting of probabilities, showing how loss aversion affects decision-making under uncertainty. Genesove & Mayer (2001), participants in the housing market are influenced by loss aversion, which has a similar effect on stock market decision where unwillingness to sell at a loss affects pricing. Loss aversion is widely used to influence investment decisions, as demonstrated by the empirical validation of this phenomenon in the financial field by Abdellaoui, Bleichrodt, and Paraschiv (2007). In experimental situations, loss aversion leads to overtrading as investors try to recoup past losses (Fischbacher, Hoffmann, & Schudy, 2017). Loss aversion, a concept central to behavioral finance, describes the tendency of investors to prefer avoiding losses rather than acquiring equivalent gains. This phenomenon significantly influences investment behavior, risk tolerance, and market dynamics

3. Research Methodology

Statement of problem:

In traditional financial theory, investors are assumed to be rational when they seeking for wealth maximization. But when it comes to investing, their emotional inclinations, ingrained psychological biases thought patterns, may affect their rationality (Jagongo and Mutswenje, 2014). Accordingly, this study tries to answer the following questions: 1) Do behavioral finance factors (Mental Accounting, Regret Averse, and loss Averse) affect the stock investment decisions of individual investors in Indian stock Market? 2) What are the main behavioral finance factors that may affect the investment decisions of individual investors in Indian stock Market?

Objectives of the Study

The Present study is carried out with various objectives. They are as below.

Primary objective:

1. To study the association between various cognitive biases and objectives of investment
2. To know the impact of Mental Accounting on the investors decision making process.
3. To know the impact of Regret Averse on the investors decision making process.
4. To know the impact of loss Averse on the investors decision making process

Research Design

The research design of this study is descriptive research (cause and effect relationship) design as this study will assist the decision maker in determining, evaluating, and selecting the best course of action to take in a given situation.

Sampling Techniques

Non-probability judgmental sampling will be used in this study as the sample is decided on the basis of two criteria; 1) Sample selected must be from the geographical area of Gujarat State. 2) The Sample must be such an investor who had made investment in stock market.

Selection of the Sample

For primary study, a sample of 300 respondents was taken from various districts of Gujarat. The respondents are those who have invested in Indian stock market.

Sample Size

The Study of primary data analysis (investor behaviour analysis) is based on sample size of 300 respondents, those who have invested in stock market.

$$n = \frac{Z^2 \times p \times q}{e^2}$$

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.0566^2}$$
$$n = 299.79$$
$$n = 300$$

Data Collection Method

Primary data has been collected for the research with the help of a structural questionnaire distributed to respondents residing in Gujarat. Investors were selected randomly using random number generator to assure that the selected sample size correctly represent the population. The questionnaire contains 2 parts first contains personal information of the respondents and second part contains questions related to psychological biases.

Source of Data

The secondary data are collected from different reliable websites and other resources. The secondary data collected from the sources which contain the websites, magazines, software, books and Electronic database Ace Equity provided by Accord Fintech Pvt. Ltd. an ISO 9001:2000 certified company. Primary data will collect through interview by using structural questionnaire.

Statistical Test

The study will cover analytical tools such as Karl Pearson correlation has been applied to see the correlation between the biases; ADF test is also applied to measure the stationarity of the data. Regression has been applied to see the impacts of these biases on investment decision were used on SPSS 21.0 for analyzing the data.

Scope of the Study

The scope of this study has been designed to study of behavioral finance and impact of behavioral finance factors on investment decision of investors. Sample size includes 300 respondents from selected cities of Gujarat. In this study different behavioral finance factors will

be studied. Amongst all some of the factors have deep impact on investment decision of investors, where major of them may be Mental accounting, Loss Aversion and Regret aversion.

Hypotheses of the Research

The major hypothesis is sub-divided in to the following sub-hypotheses:

(Ho) 1-1 There is no impact of mental accounting on stock investment decision- making at Indian Stock Market.

(Ho) 1-2 There is no impact of Regret Averse on stock investment decision- making at Indian Stock Market.

(Ho) 1-3 There is no impact of loss Averse on stock investment decision- making at Indian Stock Market.

4. Data Analysis

Reliability Assessment

To gauge reliability of the measures and internal consistency of each construct, Cronbach's Alpha was measured. The following table describes alpha co efficient of the measurement item for each construct. It indicates degree of inter-relatedness among a set of items to measure a single construct (Netemeyer, Bearden & Sharma, 2009).

Table 4.1 Reliability Assessment

Biases	Cronbach's Alpha	N of items
Mental Accounting	0.671	4
Loss Aversion	0.753	6
Regret aversion	0.824	7

(Source: Compiled from Primary Data) The above table shows value of Cronbach's Alpha of Mental Accounting was 0.671, Loss aversion was 0.753 and Regret aversion was 0.824 which were greater than acceptable level of 0.6 (Hair, Black, Anderson, & Tatham, 2009).

Correlation Assessment

Karl Pearson's Coefficient of Correlation is a mathematical approach in which the numerical expression is used to estimate or determine the range or magnitude and the direction of the relationship between two linearly related variables. Karl Pearson's Coefficient is a quantitative method that is often used in statistics. It is also known as the Pearson Coefficient of Correlation, and it is a widely accepted and widely used method. To calculate the measurement of the relationship between two variables Karl Pearson's Coefficient of Correlation formula is used.

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{n\sum x^2 - (\sum x)^2} \cdot \sqrt{n\sum y^2 - (\sum y)^2}}$$

Table 4.2 Correlations Matrix

Cognitive Biases		Mental accounting	Regret aversion	Loss aversion
Mental accounting	Pearson Correlation	1	.105	.153**
	Sig. (2-tailed)		.069	.008
	N	300	300	300
Regret	Pearson Correlation	.105	1	.158**

aversion	Sig. (2-tailed)	.069		.006
	N	300	300	300
Loss aversion	Pearson Correlation	.153**	.158**	1
	Sig. (2-tailed)	.008	.006	
	N	300	300	300
**. Correlation is significant at the 0.01 level (2-tailed).				

We have found the observations from the above table; the correlation analysis shows weak positive relationships among mental accounting, loss aversion, and regret aversion. While the association between mental accounting and loss aversion is not statistically significant ($p > 0.05$), both mental accounting & regret aversion and loss aversion, & regret aversion correlations are significant at the 1% level, indicating small but meaningful positive associations between these variables.

5. Augmented Dickey-Fuller test

The ADF test is a statistical test used to check whether a time series is stationary or has a unit root. It is widely used in research to ensure valid modeling, avoid spurious regressions, and guide further econometric analysis.

Stationary series: mean, variance, and auto covariance remain constant over time.

Non-stationary series: has a unit root, shocks have permanent effects.

- Null Hypothesis (H_0): Series has a unit root non-stationary.
- Alternative Hypothesis (H_1): Series is stationary (no unit root).

Result of ADF test

Augmented Dickey-Fuller test for Value

testing down from 15 lags, criterion AIC

sample size 300

unit-root null hypothesis: $a = 1$

Table 5.1 Test with constant

Including 3 lags of (1-L) Value model	$(1-L)y = b_0 + (a-1)*y(-1) + \dots + e$
Estimated value of (a - 1)	-1.63158
test statistic: tau_c(1)	-11.2981
asymptotic p-value	2.043e-23
1st-order autocorrelation coeff. for e	-0.001
lagged differences: F(3, 291)	7.169 [0.0001]

Table 5.2 with constant and trend

Including 3 lags of (1-L) Value model	$(1-L)y = b_0 + b_1*t + (a-1)*y(-1) + \dots + e$
Estimated value of (a - 1)	-1.63437
test statistic: tau_c(1)	-11.2842
asymptotic p-value	3.317e-25
1st-order autocorrelation coeff. for e	-0.001

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Above table shows the impact of mental accounting objective of Stock market investment of individual investors. The study found that mental accounting biased have significant positive impact on objective of Stock market investment of individual investors.($p = 0.000$)

- H_0 : There is no significant impact of Regret Aversion on the stock market Investment
- H_1 : There is significant impact of Regret Aversion on the stock market Investment

Table 6.2 Regret aversion and Investment objectives

Model Fitting Information				
Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	61.210			
Final	39.145	22.066	8	.005

Above table shows the impact of Regret Aversion objective of Stock market investment of individual investors. The study found that regret aversion biased have significant positive impact on objective of Stock market investment of individual investors ($p = 0.005$).

- H_0 : There is no significant impact of Loss aversion on the Stock market Investment decision.
- H_1 : There is significant impact of Loss aversion on the stock market Investment decision.

Table 6.3 Loss aversion and Investment objectives

Model Fitting Information				
Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	83.516			
Final	32.264	51.252	4	.000

Above table shows the impact of loss aversion objective of Stock market investment of individual investors. The study found that loss aversion biased have significant positive impact on objective of Stock market investment of individual investors.($p = 0.000$)

Conclusion:

The finding shows that mental accounting, regret aversion and loss aversion have a positive significant impact on investors' decision making. This findings consistent with the results from the studies of Qadri & Shabbir (2013), Lim (2012), Qureshi et al. (2012) and Bashir et al. (2013). It is reasonable to believe that the sample size and the chosen research methodology will be adequate to meet the desired study objectives. But like any other study, this one has a number of underlying problems. One of them is this research has the constraint of only including a sample size of 300 respondents although this sample size of investors satisfies the requirements of statistical methods. Furthermore, as this study only covers areas in major cities of Gujarat, future studies could extend to cover other areas and states as the investors in other areas may have different views on their decision making. The findings show that mental accounting, regret aversion and loss aversion factors have significant impacts on the investors' decision making.

The results of this research are mostly consistent with the evidences presented in previous studies. It is anticipated that this study will increase investors' awareness of how psychological factors affect their stock market decision-making, thus increasing the rationality of investment decisions for enhanced market efficiency. Since behavioral finance is a large and new field, there are many opportunities and problems to be faced. There are a vast number of psychological factors left to be examined. It is possible to do extensive research on other psychological elements like the anchoring effect and regret bias to examine how these affect investors' decision-making. These factors might prove to be important determinants of the investors' risk taking appetite. Policymakers and stock market authorities will benefit from this paper's findings as it helps them understand the influence that psychological factors have on investors' decision-making. After implementing the necessary policies to improve on the psychological factors and biases, further research could be carried out to investigate the effectiveness of these implementations in making the stock market a more efficient one

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