A BEHAVIOURAL FINANCE MODEL OF INVESTOR RATIONALITY

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Abstract

Portfolio investor behaviour often deviates from logic and reason, and investors display many behaviour biases that influence their investment decision-making processes. What are the reasons portfolio investors behave as they do? A portfolio investor's behaviour often deviates from logic and reason. Emotional processes, mental mistakes, and individual personality traits complicate tough investment decisions. Thus, investing is more than just analyzing numbers or figures and making decisions to buy and sell various assets and securities. A large part of investing involves individual behaviour. Ignoring or failing to grasp this concept can have a detrimental influence on portfolio performance of the portfolio investors especially in the long run.
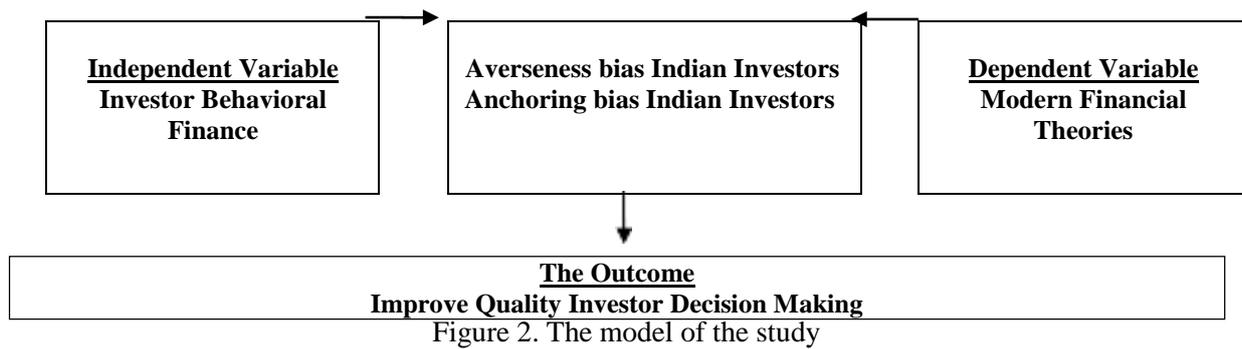
This research work attempts to understand the biases in Indian stock markets and how cognitive biases affect the investments.It visualizes a model on portfolio investor rationality and behavioural finance. It also visualizes the relevance of anchoring bias on Indian portfolio investors.

Keywords: Financial theory, Indianportfolio investors, Stock analysis, Anchoring theory, Loss aversion

Introduction

Behavioral biases in investing encompass many types. For example, cognitive biases refer to tendencies to think and act in certain ways. A cognitive bias can be viewed as a rule of thumb or heuristic, which can lead to systematic deviations from a standard of rationality or good judgment. Some controversy still exists about whether some of these biases are truly irrational or whether they result in useful attitudes or behaviour. Other biases are more emotional in nature. Understanding investor behaviour can inform investors about these biases and help them improve their decision-making processes in selecting investment services, products, and strategies. As a result of the financial crisis of 2007-2008, the discipline of psychology began to focus even more on the financial decision-making processes of individuals. Although theory may deem markets to be efficient, investor biases can explain a lot about why assets are often mispriced.

Study Model

Independent Variable Investor Behavioral Finance	Averseness bias Indian Investors Anchoring bias Indian Investors	Dependent Variable Modern Financial Theories

The Outcome
Improve Quality Investor Decision Making

Figure 2. The model of the study

Objectives of the Study

To test investor rationality and behavioral finance theories on Indian Investors

1. To study the concept of behavioral finance and various theories associated with it.
2. To analyze the nature of investors towards loss aversion.

Research Methodology

Research Design

To check the viability of behavioral finance, it is necessary to conduct a sample survey among the portfolio investors who indulge in decision making. This is to anlayze the investing behavior of the portfolio investors. Some brokers and financial institutions are also included with the general investors. A questionnaire has been designed here as a part of this research work to get information.

Research Type

It is a type of Descriptive research in the form of collection of secondary data.

Hypothesis

For whether the Indian Investors are biased towards the loss aversion, the hypothesis to be tested here is:
"There is no difference in investors' behavior when a stock is losing in the market and when it is gaining in the market."

For analyzing whether there is an effect of Anchoring bias on Indian Investors, the hypothesis to be tested here is: "There is no difference in investors' perception when the index of a stock market has consequently increased or decreased for three days in a row."

Sample Design and Size

The sample population comes from India. The sample size for this research statistical survey is 135 and they are randomly drawn.

Thus we calculate the expected frequency of all the given cells, which is worked out as:
Expected Frequency of any cell = (Row total of the cell) X (Column total of the cell)
(Grand Total)

Next step is to obtain the difference between observed and expected frequency and find out the difference between such differences i.e., calculate $(O_{ij} – E_{ij})^2$.

Next, divide the quantity $(O_{ij} – E_{ij})^2$ by the corresponding expected frequency to get $(O_{ij} – E_{ij})^2/ E_{ij}$ for all the cell frequencies.

Last, find the summation of $(O_{ij} – E_{ij})^2/ E_{ij}$ values. This is the required Chi-Square value (x^2).

$$x^2 = \sum \frac{(O_{ij} – E_{ij})^2}{E_{ij}}$$

The computed value is compared to a tabular chi-square value for analysis.

If the compared chi-square value is greater than the tabular chi-square value at predetermined level of significance, reject the hypothesis, otherwise accept the hypothesis.

Literature Review

Portfolio investors may be affected by various types of behavioral cognitive biases, which lead them to make errors. People may make predictable, non-optimal choices when faced with difficult and uncertain decisions because of heuristic simplification. Behavioral biases, abstractly, are defined in the same way as systematic errors are, in judgment (Chen et al, 2007).

The way portfolio investors think and feel affects the way they behave when making investment decisions. These influences can be categorized and identified as behavioral biases. Through an understanding of how investors and markets behave, financial advisers can adapt to a client's behavior to improve economic outcomes and enhance the overall advice delivery process. Cognitive biases are tendencies to think in certain ways that can lead to systematic deviations from a standard of rationality or good judgment, and are often studied in psychology and behavioral economics.

Although the reality of these biases is confirmed by replicable research, there are often controversies about how to classify these biases or how to explain them. Some are effects of information-processing rules (i.e., mental shortcuts), called heuristics, that the brain uses to produce decisions or judgments. Such effects are called cognitive biases. Biases have a variety of forms and appear as cognitive ("cold") bias, such as mental noise, or motivational ("hot") bias, such as when beliefs are distorted by wishful thinking. Both effects can be present at the same time.

There are also controversies over some of these biases as to whether they count as useless or irrational, or whether they result in useful attitudes or behavior. For example, when getting

to know others, people tend to ask leading questions which seem biased towards confirming their assumptions about the person. However, this kind of confirmation bias has also been argued to be an example of social skill: a way to establish a connection with the other person.

Although this research overwhelmingly involves human subjects, some findings that demonstrate bias have been found in non-human animals as well. For example, hyperbolic discounting has been observed in rats, pigeons, and monkeys.

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Researchers distinguish a long list of specific biases, applying over fifty of these to individual investor behavior in recent studies. When one considers the derivative and the undiscovered biases awaiting application in personal finance, the list of systematic investor errors seems very long indeed. Any thoughtful and planned research seeks to categorize the biases according to some kind of meaningful framework. Some authors refer to cognitive biases as heuristics (rules of thumb), while others call them beliefs, judgments, or preferences; still other scholars classify biases along cognitive or emotional lines. While "this sort of bias taxonomy is helpful— an underlying theory about why people operate under bias has not been produced. Instead of a universal theory of investment behavior, behavioral finance research relies on a broad collection of evidence pointing to the ineffectiveness of human decision making in various economic decision-making circumstances" (Pompian, 2006).

They find after using brokerage data from China that Chinese investors make poor trading decisions: the stocks they purchase underperform those they sell.

Shefrin (2000) describes behavioral finance as the interaction of psychology with the financial actions and performance of "practitioners" (all types/categories of investors). He recommends that these investors should be aware of their own "investment mistakes" as well the "errors of judgment" of their counterparts. Shefrin states, "One investor's mistakes can become another investor's profits" (2000, p. 4). Furthermore, Barber and Odean (1999, p. 41) stated that "people systemically depart from optimal judgment and decision making. Behavioral finance enriches economic understanding by incorporating these aspects of human

nature into financial models." Robert Olsen (1998) describes the "new paradigm" or school of thought known as an attempt to comprehend and forecast systematic behavior in or-der for investors to make more accurate and correct investment decisions. He further makes the point that no cohesive theory of behavioral finance yet exists, but he notes that researchers have developed many sub-theories and themes of behavioral finance.

Results and Discussion

Loss Averseness of Indian Investors

It is observed generally that the sensitivity to losses is less than gains loss aversion. This fact is justified due to the tendency of investors to stop investing in stocks when a loss occurred and selling lucrative stocks earlier than the time. There is an unevenness observed regarding the values that portfolio investors ascribe to gains and losses. The questionnaire shows that 86 investors prefer to hold stocks even if losses occurred. On the contrary, it is observed that 49 will sell their stocks. However, 90 chose to sell the stocks when if the market is booming therefore it can be concluded that 45 people will hold their stocks. We carry out a Chi-Square Analysis which illustrates these findings in detail.

There is no difference in investors' behavior when a stock is losing in the market and when it is gaining in the market.

Table 1. Observed frequency (Oij)

	Sell Stock Now	Hold Stock for a month	Total
Losing Stock	49	86	**135**
Gaining Stock	90	45	**135**
Total	**139**	**131**	**270**

The expected frequency of all the given cells is worked out as:

Expected Frequency of a cell = (Row total of the cell) X (Column total of the cell)
                               (GrandTotal)

Table 2.Expectedfrequency

	Sell Stock Now	Hold Stock for a month	Total
Losing Stock	69.50	65.50	**135**
Gaining Stock	69.50	65.50	**135**
Total	**139**	**131**	**270**

Table 3. Calculation of ChiSquare

Cell (i,j)	Oij	Eij	(Oij – Eij)	(Oij – Eij)2	(Oij – Eij)2/ Eij
(1,1)	49	69.50	- 20.50	420.25	6.047
(1,2)	86	65.50	20.50	420.25	6.416
(2,1)	90	69.50	20.50	420.25	6.047
(2,2)	45	65.50	- 20.50	420.25	6.416

Chi-Square value ($x2$) = $\sum$(Oij– Eij)2= 24.926 Eij

The degree of freedom is {(r-1)*(c-1)}, where r equals to row involved, and c is the no. of columns, so the calculated degree of freedom is {(2-1)*(2-1)} or 1. The level of significance chosen here is 0.05. On this basis calculate tabular $x2$ (Chi-Square) which comes out to be 3.84.

Since, the computed $x2$ (Chi-Square) value is 24.926, the hypothesis is therefore rejected. Thus, it can be observed that there is a difference in portfolio investors' behavior when a stock is losing in the market and when it is gaining in the market.

The risk aversion in gains causes portfolio investors to sell too quickly even before time into rising stock prices, thereby lowering prices relative to fundamentals. Conversely, risk seeking in losses causes them to hold on to securities too long when stock prices decline, thereby causing the prices of stocks with a negative momentum to overstate fundamental values.

Relevance of the Anchoring bias- with relevance to Indian Investors

Anchoring is employed to refer to the manner individuals focus on current conduct and pay less attention to longer tendencies. Thus, anchoring is considered to be the greatest remembered price. Therefore, portfolio investors lean toward using anchoring so as to put into effect similar stock prices from a day to the other. Likewise, a questionnaire shows that 51 respondents think rationally where they argue that it's difficult to predict the market. However, in an upward, market tendency of three days, for instance,37 portfolio investors assumed that it is possible to find a related tendency, though 47 assumed that it will reverse. In contrast, in a downtrend, there were 51 rational respondents who believe that it's impossible to predict the market. Further, 27 respondents came out with a related trend; whereas 57 thought in reverse trend. Thus, the propensity of earlier prices will function as 'anchors' which will clarify the detected propensity of trends in the reversed individual stocks prices.
   The validity of Anchoring is checked by the Chi-Square Test.

There is no difference in portfolio investors' perception when the index of a stock market has consequently increased or decreased for three days in a row.

Table 4. Observed Frequency (Oij)

Market Trend	Increase*	Decrease*	Total
Increase for three days	37	47	**84**
Decrease for three days	57	27	**84**
Total	**94**	**74**	**168**

* Indicates the market trend on the fourthconsecutive day. The expected frequency of all the given cells is worked outas:

Expected Frequency of a cell = (Row total of the cell) X (Column total of the cell)
                    (Grand Total)

Table 5.Expected Frequency(Eij)

	Sell Stock Now	Hold Stock for a month	Total
Loosing Stock	47	37	**84**
Gaining Stock	47	37	**84**
Total	**94**	**74**	**168**

Table 6.Calculation ofchi-square

Cell (i,j)	Oij	Eij	(Oij – Eij)	(Oij – Eij)2	(Oij – Eij)2/ Eij
(1,1)	37	47	- 10	100	2.128
(1,2)	47	37	10	100	2.703
(2,1)	57	47	10	100	2.128
(2,2)	27	37	- 10	100	2.703

$$\text{Chi-Square value } (x2) = \sum \frac{(Oij - Eij)2}{Eij} = 9.662$$

The degree of freedom is $\{(r-1)*(c-1)\}$, where r equals to row involved, and c is the no. of columns, so degree of freedom is $\{(2-1)*(2-1)\}$ or 1. The level of significance chosen is 0.05. On this basis tabular $x2$ (Chi-Square) is

3.84. Since, the computed $x2$ (Chi-Square) value is 9.662, the hypothesis is rejected.

Thus, there is a difference in portfolio investors' perception when the index of a stock market has consequently increased or decreased for three days in a row, which shows that the anchoring theory is relevant in case of Indian Portfolio investors.

Conclusions

Stability in returns is most preferred even if they are lower. That clearly implies investors priority of regularity of income over its volume.

Majority of portfolio investors expect stable returns even if they possibly be lower. This implies stable returns are generally preferred.

Portfolio investors essentially refer to data provided by companies for deciding regarding investment decisions. This data becomes very important for analyzing fundamentals. Also, forecasts of performance and analysis of historical performance are taken into account for making decision of investments.

The data provided from companies, is considered very important by majority of portfolio investors while investing. Especially for the purpose of analyzing fundamentals this data becomes relevant. On the second hand, the process of making decision of investments requires taking into account the importance of employing forecasts of Historical Performance and Professional due to its importance.

The expectation of prices to go higher over a period of time leads to gambling and holding on to stocks instead of selling it. This results in tendency to becoming tolerant towards accepting risk when threatened with losses.

Gamble and holding on to stocks are preferred by portfolio investors over selling the stock as they expect the prices will go higher. Hence, the tendency of portfolio investors to lean towards being tolerant in accepting risk when threatened with losses.

Selling a winning stock early might become the portfolio investor's choice which shows that they tend to avoid risk in gains.

A large number of respondents adopt a rational decision that is to sell a losing stock so as to invest in a gaining one.

There is an increase in the number of portfolio investors who tend to decide based on Sensex being bullish or bearish for three days in a row expecting that market would continue like that

for a while.

This clearly establishes relation between the behavior of portfolio investor and the way market keeps for a few days in a row. It shows their tendency of loss aversion bias in which their investment behavior changes in accordance with the losses or gains as depicted by the market for a consistent period of time.

Portfolio investor's behavior shows their tendency towards Loss Aversion Bias in which their losses and gains show differences in their behavioral tendency.

Portfolio investors can make use of the findings that show that anchoring match their finance behavior. A period of three consecutive days of stock market past performance is considered as a trigger that shifts the portfolio investors' perception regarding market trend.

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