The Relationship between Risk Profile and Investment Behaviour of Investors

Doctoral thesis submitted

In Partial fulfilment of the requirements for the award of the Degree of

DOCTOR OF PHILOSOPHY

IN

MANAGEMENT

By

SAMUEL EZRA CHAKKARAVARTHY

UID No: 14JU11300020

Under the guidance of

Dr. Goutam Tanty

(Research Supervisor)

Associate Professor

ICFAI University, Jharkhand, Ranchi

ICFAI UNIVERSITY JHARKHAND

RANCHI

March 2021

THESIS COMPLETION CERTIFICATE

This is to certify that the thesis entitled on **'The Relationship between Risk Profile and Investment Behaviour of Investors'** submittedby **Samuel Ezra Chakkaravarthy** in partial fulfilment of the requirements for the award of Degree of Philosophy is an original work carried out by him under my guidance. It is certified that this work has not been submitted anywhere else for the award of any other Degree or diploma of this or any other university. I also certify that he complied with the plagiarism guidelines of the university.

Dr. Goutam Tanty
(Research Supervisor)
Associate Professor
ICFAI University, Jharkhand,
Ranchi

PLAGIARISM CERTIFICATE

URKUND

Urkund Analysis Result

Analysed Document:	Samuel Plagarism check.docx (D107382106)
Submitted:	6/1/2021 3:33:00 PM
Submitted By:	rumna.b@iujharkhand.edu.in
Significance:	1 %

DECLARATION OF AUTHORSHIP

I declare that this thesis titled **'The Relationship between Risk Profile and Investment Behaviour of Investors'**submitted by me in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy in Management from ICFAI University, Jharkhand, Ranchi is my own work. It contains no material previously published or written by another person nor material which has been accepted for the award of any degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text. I further state that I complied with the plagiarism guidelines of the university, while preparing the thesis.

Samuel Ezra Chakkaravarthy

UIDNo:14JU11300020

01.03.2021

Chennai

ACKNOWLEDGEMENT

At the outset, I dedicate this thesis to the ever loving memory of my late mother Mrs Glory Ezra Samuel MA., M.Ed., who brought me up with much hardship as a single parent.

I take this opportunity to extend my sincere gratitude to the support and encouragement given by those wonderful people around me, without which my research work would not have been completed.

I am extremely grateful to ICFAI University Jharkhand for giving me this wonderful platform to do research pertaining to my area of profession. I would like to place on record the research support given by IUJ in organizing seminars and workshops to help me and my fellow researchers.

I am immensely thankful and grateful to Dr. Goutam Tanty, my research supervisor who has been very emphatic and a constant source of support. My salutation to Dr. Tanty for his clear cut approach in getting the study done in spite of joining me half way through the research process. I thank Dr. Birendra Goswami for his help during the initial stages of the study.

I am thankful to the research board of the ICFAI University Jharkhand who contributed greatly in making the research a quality work through their guidance and their suggestions in the half yearly progress presentations.

I thank the Vice Chancellor Prof. Rao from the bottom of my heart for constantly encouraging and motivating me when I was having difficulties in my research progress.

I would also like to thank Dr. Rumna Bhattacharyya, Dr. Barik and the

Ph.D.support team for their encouragement and regular monitoring of progress in my research and the pains taken to organize various sessions to improve the quality ofresearch.

I would also like to give special thanks to all the administrative staff members of ICFAI University Jharkhand, who have been always supportive during my visits to the IUJ campus.

I thank all the respondents for sparing their valuable time to provide me with their responses. My special thanks to the HR department of the corporates who allowed me to administer the questionnaire to their employees

I thank the investment advisors in Chennai for their valuable time and inputs which helped me to prepare the questionnaire for the study.

This section will be meaningless without mentioning my loving family. I thank my wife Sabita Jha for her constant motivation through every stage of his research work. I also thank my son Kewal Roshan for understanding and providing me the space and time to do my research work. I thank my siblings Dr.Priyadarshini and Dr. Anita for their constant support in this journey. Last but not the least; I am highly indebted to my extended family members especially my niece Mrs Grace and my friends for the encouragement I received during the research work.

Samuel Ezra Chakkaravarthy

Date:01.03.2021

Place: Chennai

ABSTRACT

Introduction

The investment scenario in India before the liberalisation was limited to very few products and services. The most sought after investment avenues were gold, real estate, fixed income products, insurance policies etc. These products had the element of safety with mostly assured returns and minimal capital appreciation. The investors at those times were little exposed to understanding the impact of inflation on their returns. Post-liberalisation, with the government of India opening the door for investments, the investor was flooded with a lot of retail investment product. But investors have limited skills and financial knowledge to evaluate and understand these financial products. Also in India, there have been few regulations to streamline the sale of financial products and protect the investor's interest.

Research problem and rationale for thestudy

Investment advisory in India is still in the nascent stage and it is a very urgent necessity. An investment advisor needs to understand the risk attitude of the investor by using psychometric tools and suggest appropriate solutions/products as per their needs.

Another challenge for the advisor is to deal with Investment bias. This to a large extent jeopardizes the advisor'splan because for certain goals and there needs to be a trade-off between risk and returns to achieve a goal. Due to these biases they may have set opinions on certain investment avenues.

Biases / heuristics are the beliefs and preferences individualsexhibit which results in a systematic deviation from the rational behaviour. Identifying these biases and their impact on investment decisions is a subject of ongoing research in

understanding the psychology behind investment behaviour..

Thus, it is essential to assess the risk tolerance andidentify these behavioural biases that affect the investment decisions of individual investor's inIndia.

Literature Review

In the current study, a detailed research work was done on the various behaviour theories, the concept of risk and the impact of risk on socio-demographic factors. Behavioural finance concepts were researched extensively and different biases were identified to be used in this study. Mediation analysis using various methods was reviewed to find out the appropriate method to be used in this model.

Overview of Risk

Human perception of risk is something very complex and has gone through extensive research by both economists and psychologists. The behaviour of being averse to any negative incidence is inborn in us right from the time we came into the world. Humans have been trained in their senses to intuitively look for any danger that can affect their well-being.

However, the aspect ofrisk is very subjective and varies from person to person and from time to time. Many a time we tend to look at the past, search for some confirmation and accordingly adjust for the future. Time and again we come across many uncertain events which end in an unfavourable experience even though the probability of its occurrence is very small. The outlook towards risk is more of an intuition where the mind subconsciously develops certain patterns and attitude towards certain objects, outcomes or for that matter certain words and colours.

Overview of Behaviour finance

Traditional finance was based on various finance theories and principles based on investor's rationality and market efficiency like the Theory of Arbitrage Principles of Miller and Modigliani, Markowitz Portfolio Theory, Sharpe's Capital Asset Pricing Model and Option Pricing Theory of Black, Scholes and Merton. According to traditional finance, markets and itsforces are efficient and systematic.

Despite all the theories and suppositions of traditional finance on rationality and efficiency, behavioural researchers reason that both investorbehaviour and market behaviour need not be rational and efficient.

According to Behavioural finance, individualinvestors can be irrational in their decision making because of their psychology. Moreover, it has been long accepted in the field of psychology that human attitudes have two components, one - the person's belief and the other - the person's feelings and emotions. It is this duality which makes it more complex and interesting for research.

In this background, it is imperative to understand how investors are making their investment decisions. Independent Financial Advisors (IFA)must be able to understand the irrational behaviour of the investors to advise them.

Objectives of thestudy

The present study aims to assess the risk tolerance level of Individual investors in Chennai, India and their investment behaviour.

It also highlights the need for identifying the Investors'behavioural biases and group them into categories such as Emotional Bias and Cognitive Bias.

Thepresent study aims to conduct a descriptivestudy of the socio-demographic

status of individual investors. For the present study socio-demographic variables such as gender, age, occupation, income, investment experience is analysed.

The main objective of the study was to assess the level of Risk tolerance, the investment behaviourand to identify which behavioural biases exist among individual investors in Chennai.

More specifically, the present study intends to achieve the following objectives:

1 To assess therisk attitudeof individual investors in Chennai, India

2 To identify the behavioural biases among individual investors in Chennai, India

3 To analyse the influence of socio-demographic factors on behavioural biases among individualinvestors

4 To analyse the influence of socio-demographic variables on the Risk tolerance of individualinvestors in Chennai

5 To establish the relationship between risk tolerance and behaviour bias of individual investors in Chennai.

6 To analyse the relationship between risk profile and actual investor behaviour.

Research design and methodology

The present study proposes to use a mixed-method approach to achieve the stated objectives. It is established that the mixed approach is appropriate when researchers know little about the subject and as such, it should be examined as to what variable need to be used using qualitative research. The variables thus identified can then be used to study the target sample using quantitative research. Therefore to develop the research instrument and to identify the risk profile and bias present in the

investor, a pilot study was first conducted and then a detailed survey was conducted with the sample size to identify the risk profile and bias of individual.

Scope of the Research

The research work is done within the limits of Greater Chennai and does not include the suburbs and surrounding areas of Chennai. Also, this study is limited to respondents who are employed and above 21 years of age.

Post-liberalisation, the investors have a variety of investments to choose from. The study looks into often traded investmentslike Gold, Real estate, Mutual funds, and Insurance policies. Speculative investments and exotic investment options like Wine, Art etc are left out of this study.

The study focuses on the risk-taking ability and biases of retail individual investors. Though there are several methods to assess the risk tolerance of the individual, the study adopts the simple ranking method adopted by most investment advisors across the world to assess the risk-taking ability of the respondent. The questionnaire tries to be generic in including most of the domains to assess the overall risk-taking ability of the respondent.

Though there are many biases present when making investment decisions, only ten biases are taken to assess the bias score of the respondent.

Hypothesis

The hypothesis is an uncertain proposition or assumption on the expected relationship between two or more variables. These assumptions are made and tested to accomplish the objectives identified in the study. The theoretical model framed by the researcher forms the base for developing the hypothesis.

- Socio-demographic factors like Age, Gender, Income, Occupation

donotinfluence the risk-taking ability of the investor

- Socio-demographic factors like Age, Gender, Income, Occupation haveno influence on the behaviour bias of the investor
- Socio-demographic factors like Age, Gender, Income, Occupation do not determine Investor behaviour
- Relationship between behaviour biases and investor behaviour
- Relationship between risk profile and investor behaviour
- Relationship between behaviour biases and the risk profile of the investor
- The Mediating role of independent variables and the dependent variable

Hypothesis Conclusion

Independent variables (risk and bias) and dependent variable (Investor behaviour) Relationship Summary:

1. Influence of Behaviour Biases onInvestor behaviour

In the current study, bivariate regression was done with bias being the predictor andInvestor behaviour as the criterion variable. It was found that biases have a significant influence in determining Investor behaviour.

2. Influence of Risk profile onInvestor behaviour

In the current study, bivariate regression was done with risk being the predictor andInvestor behaviour as the criterion variable. It was found that risk has a significant influence in determining Investor behaviour.

3. Influence of Behaviour biases and the Risk profile of the investor

In the current study, bivariate regression was done with bias being the predictor andrisk as the criterion variable. It was found that biashas a significant influence in determining Risk.

4. Mediating role of independent variables and the dependent variable

In the current study, the bias score is taken as the independent variable and the investment decision score which determined the Investor behaviour is taken as the dependent variable. Risk is taken as the variable which mediates the cause and effect relationship between bias and investment decisions. By using meditational analysis, risk is established as the mediating variable with partial effect on the causal relationship between bias and Investor behaviour.

5. Dominant Bias influencing Investor behaviour score

The current study aimed to find out the dominating bias which influences investment decisions. It was found that emotional bias is the dominant bias influencing the investment decision of Investors in Chennai.Familiarity bias is the dominating bias whereas self-control bias and mental accounting bias are the least affecting biases.

6. Correlation between Bias, Risk and Investor behaviour

In the current study, Pearson correlation test was done with the three variables to find out the correlation among the variables. It was found that all three variables under study have a positive correlation with each other significantly.

7. Relationship between Risk profile and actual investor preference

In the current study, both Pearson correlation and regression analysis was done with the risk as the predictor and and investor preference for investments as the criterion. It was found that the investor behaviour in choosing investment products is significantly influenced by the risk profile and there exists a moderate positive relationship.

Findings of the study aligned to Objectives

1. Is the risk profile influenced by the socio-demographic factors of the investors in Chennai?

In the current study, all the factors like age, gender, occupation and income significantly influence the risk-taking ability of the investor.

2. Is the investment decision influenced by the risk-taking ability?

In the current study, investment decision of the respondent is significantly influenced by the risk taking ability.

3. Does Behaviour bias influence investment decisions?

In the current study, investment decision of the respondent is significantly influenced by the behaviour bias.

4. Does Behaviour bias influence the risk-taking ability?

In the current study, it was found that behaviour bias significantly influences the risk-taking ability and there is a positive correlation between behaviour bias and risk tolerance.

5. Establishing risk as the mediating variable between Behaviour bias and Investor behaviour.

In the current study mediation analysis was done to establish the mediating effect of risk. Risk is established as the mediating variable with partial effect on the causal relationship between bias and Investor behaviour.

6. Is the behaviour to choose financial products influenced by the risk-taking ability?

In the current study, the decision to choose financial products is influenced by the risk taking ability.

Contribution of the study

Academic: Apart from the findings, this paper will help further researchers by way of the literature survey and review done. Based on the research methodology, design, data survey, data analysis and interpretation, further research can be started from the results of this study.

Financial Planners and Advisors: This research will help the advisors in this profession to understand the various behaviour biases, the risk classification and how they affect the investor's decision-making capability. This will help them to adjust and adapt according to their client needs.

Investors: This paper will serve as a reference to all the investors as to what bias and risk tolerance are and how they affect their investment decisions. Once it is understood, the investors can shed off their biasness in a significant manner so that they can make rational investment decisions according to their needs.

Conclusion

Before liberalisation in India, investment in assets more or less involved in investing in properties, gold, fixed deposits among all the classes with the rich and affluent investing in shares of publicly listed companies. With the introduction of risky asset classes like MFs, ULIPs, there is a compelling need to understand investment in the area of risk capacity and behaviour bias of the investor.

The current study attempts to analyse the risk-taking capacity and bias present among the retail investors in Chennai. The findings of the study proved that biases present in the investor significantly influence the decision of the investor when making an investment decision.

The model established in the study also proved conclusively the risk-taking capacity of the investor also affects the investor's decision when making investment decisions.

Also, the study takes a detailed view of the behaviour biases present in the investor along with the risk-taking capacity of the investor. The study is highly relevant in the current investment scenario as it throws insight into the risk propensity and biases along with the cross-sectional relationship with socio-demographic factors like age, gender, income, occupation. Researchers in the investment domain can use this study to do further studies and investment advisors can use this study to understand behaviour bias and risk propensity to give appropriate advice to their clients.

TABLE OF CONTENTS

PART I

PART 2

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
BB	Behaviour bias
BF	Behaviour finance
BBT	Behaviour bias tolerance
CB	Cognitive bias
CFA	Confirmatory factor analysis
CFP	Certified financial planner
EB	Emotional bias
EMH	Efficient market hypotheses
ELSS	Equity linked savings scheme
ETF	Exchange traded fund
FFM	Five factor model
IFA	Independent financial adviser
IRDA	Insurance regulatory and development authority
IT	Investor behaviour
LIC	Life insurance corporation
MF	Mutual Fund
PPF	Public provident fund
RIA	Registered investment adviser
RP	Risk profile
RT	Risk tolerance
RTS	Risk tolerance score
SPSS	Statistical product and service solutions
TRA	Theory of reasoned action
TPB	Theory of planned behaviour
TTM	Trans theory model of behaviour change
ULIP	Unit linked insurance policy
WTP	Willingness to pay
WTA	Willingness to accept

CHAPTER 1

INTRODUCTION

CHAPTER-1

INTRODUCTION

The present study aims to identify the relationship between the behavioural biases and risk-taking ability of individual investors investing in Chennai. This chapter begins with the overview on behavioural finance and risk behaviour.Subsequently, the research motivation and the relevance of the topic are discussedby thescope and contribution of the study. The chapter concludes with the organisation of the thesis.

RESEARCH BACKGROUND

1.1 Overview of Risk

Human perception of risk is something very complex and has gone through extensive research by both economists and psychologists. The behaviour of being averse to any negative incidence is inborn in us right from the time we have come into the world. Humans have been trained in their senses to intuitively look for any danger that can affect their well-being.

However, the aspect of risk is very subjective and varies from person to person and from time to time. Many a time we tend to look at the past, search for some confirmation and accordingly adjust for the future. Time and again we come across many uncertain events which end in an unfavourable experience even though the probability of its occurrence is very small.

Risk Tolerance (RT) measures the risk-taking ability of an individual. When an individual is faced with two outcomes, a less favourable outcome and a favourable outcome, RTis the extent to which the individual will choose the former over the

latter where there always exists an uncertainty on the outcomes.

Assessing risk tolerance is very complex as it is domain-specific. The main domains that have been identified are Physical, Social, Ethical, Financial and Health-**Jackson, Hourany, and Vidmar (1972).** According to them, behaviour within domains is consistent but not across domains. For example, a person who rides a two-wheeler without wearing a helmet will exhibit the same attitude when it comes to driving a car by not adhering to the safety standards, i.e. he is a risk taker in the physical domain by retaining the risk himself. However, the same person who retains the risk in the physical domain may not be able to take risk in the financial domain. Financial risk tolerance impacts all financial decisions. Financial decisions involve making decisions on investments, credit decisions, insurance decisions etc.

Over the last 30 years, risk tolerance and risk tolerance testing have been the topic for various studies and research. Many research studies have been done to understand the role of risk-taking ability in the investment decision process. It was found that risk tolerance is a crucial factor that affects the investor's financial decision.

Studies have found that socio-demographic factors significantly influence risk tolerance in the investments decision process. According to **Dwyer, Gilkeson and List (2002)** women take less risk as compared to men. They also noted that women when they are rich, working with a good income, or looking forward to inheriting property tend to invest in risky assets.

According to **Embrey & Fox (1997)**, divorced, older men are likely to invest in risky assets. **Hallahan, Faff and McKenzie (1999)**noted thatthere exists a positive

correlation between RT and socio-demographic factorslike gender and income but not with age. They also published that the important contributing factors to explain risk-tolerance of the investor are demographic variables such as age and gender.

As a practice, financial advisors assess the risk tolerance of the individuals before advising on the assets to the investors. One incident which got noticed was that the investors were not able to book profits in their portfolio even though the proportion of equity assigned in the portfolio is based on their risk-taking capacity. So, there was an urgent need to look outside the purview of risk tolerance. Risk aversion as a view was looked upon and the different psychological biases like loss aversion and regret were identified.

According to **Kahneman and Lovallo (1993)**, risk aversion is well explained by loss aversion. Loss aversion refers to the fact that people tend to be more sensitive to losses as compared to gains. An individual will experience more pain when he loses money when compared to the pleasure he will get when he gains money.Anticipated regret also leads to risk aversion according to **Josephs, Larrick Steele and Nisbett (1992**).

According to **Zeelenberg** (1996),

"Regret is a negative, cognitively determined emotion that we experience when realizing or imagining that our present situation would have been better, had we acted differently;"

According to **(Loomes & Sugden, 1982**), investor's decision is based not only on

expected value of payoffs but also on expected regret.

1.2 Overview of Behaviour finance

Traditional finance was built on various finance theories and principles based on investor's rationality and market efficiency like the "*Theory of Arbitrage Principles*" of **Miller and Modigliani**, **Markowitz***"Portfolio Theory"*, **Sharpe**'s "*Capital Asset Pricing Model*"and "*OptionPricing Theory*" of **Black, Scholes and Merton.**

According to traditional finance theories, markets and its agents are efficient and systematic. The Efficient Market Hypothesis states that because the market is efficient, the true value of the security is priced by incorporating all the available information (Fama, 1970).Despite all the theories and suppositions of traditional finance on rationality and efficiency, behavioural researchers reason that both investorbehaviour and market behaviour need not be rational and efficient.

"People in standard finance are rational. People in behavioural finance are normal." **- Meir Statman**

In the 1970s, behavioural theoristsconfronted the rational theorists by studying theinvestor's reasoning and emotionalimpact in investment decisions. Behavioural finance as a concept emerged combining the emotional and reasoningfactors that impact investment decision making thus substitutingthe theories of conventional finance. According to behavioural finance, individual investors can be irrational in their decision making because of their psychology.

Criticising that the Expected Utility Theory is based on investment decision made under uncertainty, Kahneman and Traversky (1979) came with the Prospect Theory. (Shefrin and Statman, 1985; Daniel *et al*., 1998) reviewed that individual investors are exposed to numerous behavioural contradictions, which becomes the biggest barrier in wealth maximisation. Therefore, it becomes important to study the behaviour of individual investors while making investingdecisions.

1.3 Motivation for thestudy

The investment scenario in India before the liberalisation was limited to very few products and services. The most sought after investment avenues were gold, real estate, fixed income products, insurance policies etc. These products had the element of safety with mostly assured returns and minimal capital appreciation. The investors at those times were little exposed to understanding the impact of inflation on their returns. Post-liberalisation, with the government of India opening the door for investments, the investor was flooded with a lot of other investment opportunities.

However,thisincreasedcompetitioninthefinancialservicesector exposed the Indian investors to a variety of investment productswith the investors having limited skills and financial knowledge to evaluate and understand those financial products.In India there have been little regulations to streamline the sale of financial products and protect the investor's interest.

Investment advisory in India is still in the nascent stage and is also a very urgent necessity. An investment advisor needs to understand the risk attitude of the investor by using psychometric tools and suggest appropriate products as per their

needs.

Another challenge for the advisor is to deal with investment bias. This to a large extent jeopardizes the advisor's plan because for certain goals there needs to be a trade-off between risk and returns to achieve a goal. Due to these biases they may have set opinions on certain investment avenues.

Biases / heuristics are the beliefs and preferences individualsexhibit which results in a systematic deviation from the rational behaviour. Identifying these biases and their impact on investment decisions is a subject of on-going research in understanding the psychology behind investment behaviour..

Thus, it is essential to assess the risk tolerance andidentify these behavioural biases that affect the investment decisions of individual investor's inIndia.

"*Financial advising is a prescriptive activity whose main objective should be to guide investors to make decisions that best serve their interests."* Daniel Kahneman

Moreover, it has been long accepted in the field of psychology that human attitudes have two components, a person's belief and the person's feelings and emotions **Callan and Johnson (2003)**. It is this duality that makes it more complex and interesting for research.

1.4 Relevance of the topic:

A lot of studies on the behaviour of individual investors in investment decisions have been performed extensively in developed countries. .**Kumar and Goyal, (2015)**, **Sahi and Arora, (2012)** pointed out that even though a lot of studies have been done in other countries, very little has been done in India.Also, it would be

difficult to emulate those research findingsto Indian investors because the diversity of culture, spending and saving habits etc.

(Funfgeld and Wang, 2009) study was to analyse the presence of herding in financial markets. They stated that herding bias is not prevalent in developed countries but present in emerging economies. They felt this was because the emerging markets are considered riskier and less mature than the developed economies. This gives enough scope for conducting research exclusively on the risk attitude and behaviour of individual investors.

In this background, it is vital to understand how investors are making their investment decisions. Also, it becomes imperative in the current environment for the Independent financial advisors (IFA)in understanding the irrational behaviour of the investors to advise them effectively.

The limitation of the earlier work can be identified to conduct further research on the influence of risk attitude and behavioural biases on investment decisions.

Therefore, this study aims to examine the relationship between risk tolerance and behavioural biases among individual investors in Chennai because of the significance of risk attitude towards investment behaviour.

1.5 Scope of the study:

The research work is done within the limits of Greater Chennai and does not include the suburbs and surrounding areas of Chennai. Also, this study is limited to respondents who are employed and above 21 years of age.

Post-liberalisation, the investors have a variety of investments to choose from. The study looks into often traded investments like Mutual funds, Insurance policies,

Real estate , Gold. Speculative investments and exotic investment options like precious stones, Art etc are left out of this study.

The study focuses on the risk-taking ability and biases of retail individual investors. Though there are a several methods to assess the risk tolerance of the individual, the study adopts the simple ranking method adopted by most investment advisors across the world to assess the risk-taking ability of the respondent. The questionnaire tries to be generic in including most of the domains to assess the overall risk-taking ability of the respondent.

Though there are many biases present when making investment decisions, only ten biases are taken to assess the bias score of the respondent.

1.6Contribution of thestudy

This study develops an understanding of the risk tolerance and investment behaviour of individual investors in Chennai, India. Hence, it improves the theoretical knowledge by adding new evidence on the investment behaviour of investors.

The observations of the study will also facilitate financial advisors in supporting their clients better and offer them optimaladvice. The findings of this study will empower individual investors to havea better understanding of risk tolerance and behavioural biases which can guide them in the different stages of investment.

The present study applies qualitative and quantitative methods for collecting information on risk tolerance and behaviour bias. Thus it creates a methodological contribution to the literature by using the mixed-method approach to investigate the behavioural biases of individual investors in Chennai.

1.7 Organization of thethesis

This thesis provides a detailed analysis of relevant information regarding risk profile, behavioural biases and their impact on investment decisions. .

This study comprisesfive chapters. The summary of each chapter is specified asfollows:

Chapter 1 gives the introductionand background of the research, research motivationand relevance of the topic, scope of the study and contribution of the study.

Chapter 2 presents the literature review on risk tolerance, risk measurement and behavioural biases detailing the various biases under the heads Emotional and Cognitive. Also, literature on the impact of socio-demographic variables on risk tolerance and behavioural biases is presented. The literature review shows the existing research gaps and will further assist in the developing of a conceptual framework for the present study.

Chapter 3 explains the research methodology and methods of data analysis applied to study the conceptual framework designed in the previous chapter and the findings of the pilot study.

Chapter 4 presents the analysis of the data and the analysis of the study.

Chapter 5 summarizes the key findings of the preliminary and main study and presents the contribution and suggestion of the current study. The chapter concludes with avenues for future research based on the limitations of the current study.

1.88 Summary:

The chapter introduces the concept of behavioural finance and risk-taking in the investment domain. An overview of risk and behaviour fiancé is presented and a detailed review of the two will be done in the subsequent chapter. The relevance of the subject and the motivation to do the research was also presented. The chapter closes with the way the thesis progresses.

CHAPTER 2

REVIEW OF LITERATURE

CHAPTER-2

INTRODUCTION

A Literature survey allows the researcher to get an explorative knowledge on the subject to be investigated and thus can help in identifying gaps and limitations by extending the research already done by others. A Literature review in a study involves a systematic and explicit assessment of the research work pertaining to a related area. This chapter aims to present a review of the literature surveyed for this study. Studies done in the domain of risk and the behaviour biases influencing investment decision is reviewed in this chapter. This review chapter starts with the literature on risk, behavioural studies followed by the investment avenues available. It proceeds with the factors that influence investment decisions like socio-demographic factors, risk profile and behavioural biases. This chapter ends with a gist of the gaps and limitations and a detailed brief on the gaps will be presented in the next chapter.

This chapter is divided into nine sections

1. Behavioural studies

a. Theories, Behaviour measurement,

2. Investment avenues and investment decisions

a. Wealth trends in India, Investment Avenues, factors affecting investment decisions

3. Socio demographics affecting investment behaviour

a. Influence of age, gender, income, occupation on investment decisions

4. Overview of risk

a. Risk Attitude and Capacity, Risk measurement

5. Risk profile and investment behaviour

a. Literature relating to the influence of risk profile on investment decisions

6. Overview of behaviour finance

a. Origin of behaviour Finance, theories and literature

7. Behaviour biases affecting investor behaviour

a. Literature relating to the influence of behavioural biases on investment decisions

8. Gaps and limitations

9. Concluding remarks on the literature review

2.1 Behavioural studies

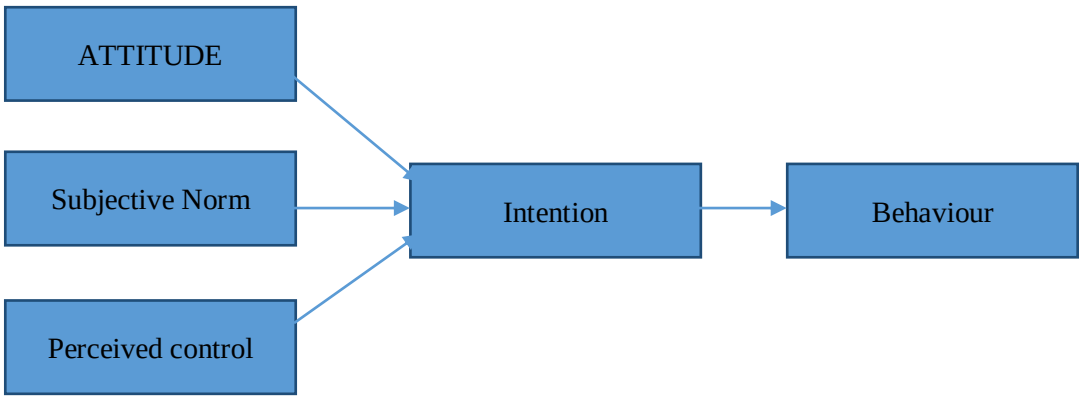
Analysing and explaining behaviour is an on-going study for years and there are still the possibilities of many new theories replacing the existing ones.

Perhaps the first widely accepted theory on human behaviour was 'TheTheory of Reasoned Action'(**Fishbeinand Ajzen** 1975). This theory tried to fit the missing link as to how an attitude turns into behaviour which earlier was unexplainable. The theory stated that a person's behaviour is determined by his attitude.

Later it was upgraded by the same theorists by adding perceived control to the earlier model and thus theorized that Intention coupled with perceived control determines a person's behaviour. This theory was called The Theory of Planned Behaviour (1991)

Both the theories were widely accepted and applied by many researchers in areas such as weight loss, consumer behaviour, substance abuse (**Ajzen and Fishbein**, 1980), consumer complaining (**East** 2000), online surveys (**Bosnjak, Tuten and Wittmann**,2005) etc.

Fig 2.1 Behaviour theory



2.1.1 Theory of Planned behaviour model

According to Ajzen and Fishbein (1980), four essential elements constitute an approximately defined behaviour. These are

a. Action

b. Target

c. Context

d. Time

Applying the above theory, investment behaviour can be short term or long term. The decision to invest is the action, the target is where the investment is made (fixed income, gold, equity), for what the investment made is the context(retirement, house purchase) and the frequency is the time(could be one time or regularly).

2.1.2 Measurement of Behaviour:

Ajzen and Fishbein state that behaviour can be measured by single acts or behavioural categories. Most of the financial behaviour according tothemis defined either by behavioural categories or by single acts.

For example, Investment management as behaviourcan be explained by the actions of the individual, such as reviewing portfolio returns monthly/annual, booking profit or losses. It can be said that the behaviour of the individual may not be provided by these acts in some cases.

Xiao (2014) discusses how the two behaviour theories TRA and TPB can be applied to financial behaviour research. With these theories he modelled the Trans Theoretical model of behaviour change (TTM), a multi-staged model to guide people towards positive actions stage by stage.

According to the theorists **Ajzen and Fishbein (**1980), behaviour can be measured in either of the following ways:

a. As a binary variable (whether or not to perform a behaviour(to use a credit card or cash)

b. As multiple choices, (what is the preferred type of investment? a. Fixed

deposits, b. Real estate, c. Equity, d. Gold)

c. Quantifying the extent to which the behaviour is performed, (How much is your contribution to retirement? a. <5000, b. 5000-10000, c. 10000-15000, d. 15000-20000, >20000)

d. Measuring behaviour as per the frequency, (How often do you invest? a. monthly, b. quarterly, c. biannually, d. annually

The theorists point out that according to the target behaviour under study any of the above or a combination of the above measures can be used.

2.2 Investment Avenues

In the last twenty-five years, there has been a drastic change in the availability of investment products in India. Real estate, gold, public provident fund and fixed deposits were the most preferred avenues of investments in the pre-liberalisation era. LIC policies and public provident fund were the preferred options for long term wealth creation because of the ease in which the money can be invested (annually, quarterly, monthly) with tax benefits under 80C of the Income-tax act.

Post-liberalisation seeing the vast opportunities available and the disposable income available with the public, many institutions and private banks started flooding the markets with financial products like insurance policies (traditional policies, ULIPS), mutual funds(equity schemes, debt schemes, hybrid schemes, tax saving schemes), gold schemes etc. The products were continuously modified to cater to customer's changing needs. But then little was done to educate and make the investors aware of the risk-return matrix of investments. This resulted in the

investors investing heavily in ULIPs and equity schemes. Post-2008 global selloff many investors who invested heavily in ULIPs and equity schemes lost their life savings which made the government of India to grant more powers to the regulating bodies, IRDA, SEBI in a bid to protect investor's interest. As such, India languishes along with the other developing countries with very poor financial literacy level. Socio-demographic factors also have a significant impact on the financial literacy level.

Various studies have been conducted to highlight theses influences, gender and age **Worthington (**2006), Education **Bhushan and Medury**(2013), income and profession **Al-Tammi and Bin Kalli**, (2009); **Chen and Volpe,** 1998).

From the last decade, a lot of measures have been taken by the finance ministry as well as self-regulating bodies to make the investors more financial literate. One of the main aims of financial literacy programs is to sensitise investors to move from physical assets to financial assets.

Physical Assets are tangible and as such can be touched and felt. The popular forms of physical assets in investments are gold, precious metals & stones, real estate and more recently art as a form of investment is catching up. The main disadvantage of theses physical assets is its security and maintenance.

Financial Assets are intangible and the popular types of financial assets are fixed deposits, corporate bonds, equity shares, ETF traded funds etc. The disadvantages faced in physical assets like security and maintenance is very minimal with the financial assets.

Following the on-going financial literacy drive to increase financialisation of

savings, there has been significant growth among financial assets when compared to the physical assets as shown in the table below-

Table 2.1.Wealth allocation trend in the last 5 years

Category	FY19 %	FY18 %	FY17%	FY16 %	FY15 %
Financial Assets	60.95	60.21	58.47	57.35	57.25
Physical Assets	39.05	39.79	41.53	42.65	42.75
Total	100	100	100	100	100

Source: Karvy wealth report 2019

Table 2.2.Top ten Investment options,

Investment Options in India : Snapshot					
	Risk	Tenure	Liquidity	Returns	Taxation
Direct Equity	High	Can be sold anytime	High	Market-linked	STCG - 15%, LTCG-10%* (Long term 1 year)
Equity mutual fund	Moderate -High	Open end^	High	Market-linked	STCG - 15%, LTCG-10%* (Long term 1 year)
Real estate	High	Can be sold anytime	Low	Market-linked	STCG- Added to income, LTCG-20%**
Gold	Low- moderate	Can be sold anytime	Varies	Market-linked	STCG- Added to income, LTCG-20%**
PPF	No risk	15 years	Partial withdrawals^^	7.6 percent	Interest tax free (EEE status)
Bank fixed deposit	Low	7 days to 10 years	Premature exit	Varies	Interest taxable as per tax slab
Debt funds	Low-high	Open end	High	Market-linked	STCG- Added to income, LTCG-20%**
RBI taxable bonds	No risk	7 years	Low	7.75 percent	Interest taxable as per tax slab
NPS	Low-high	60 minus entry age	Limited	Market-linked	40% of corpus tax exempt, Annuity taxable
Senior Citizens' Saving Scheme	No risk	5 years	Low	8.3 percent	Interest taxable
* Gains up to Rs 1 lakh exempted ** Post indexation ^ ELSS comes with 3-year lock-in ^^ Subject to conditions					
For Physcial gold, paper gold and debt funds long termis 3 year; Real estate long term is 2 years					

Source: Economic times Nov-11, 2019

Bhushan and Medury (2013) observed significant differences in preference for fixed deposits, insurance policies and other investment products. They concluded that men take more risks than women and women tend to be very conservative in choosing their investment products.

Palanivelu and Chandrakumar (2013) tried to find out the factors influencing decisions investment avenues among salaried employees. They pointed out that education level, awareness of financial products make a significant impact on deciding the investment product.

Singahania and Kathuria (2012) conducted a study on private banking employees. They stated that most of the respondents prefer secure investments like provident funds, fixed deposit, and life insurance policies. And that only 40% had a high level of awareness on the existing investment avenues.

Harikanth and Pragathi (2012) indicated that income and occupation play a significant role in the selection of investment avenues. They also conclude that risk tolerance level of the investor plays an important factor on choosing the investment product.

Sanjay Kartu Das (2012) found an urgent need for increasing the financial literacy level of middle-class investors. He pointed out that fixed deposits remained the most popular form of investment followed by insurance policies. Security and safety of the investment were the criteria for investing.

Chaturvedi and Khare (2012) also echoed the fact that fixed deposits, life insurance followed by small savings schemes in that order are the most preferred avenues of investments.

Giridhar and Sathya (2011) stated that investors always have a mind-set of safety and security when it comes to choosing investment products. They also pointed out that tax benefits wereother criteria for choosing a particular investment product (PPF, LIC, ELSS etc).

Tabassum Sultana (2010) confirmed that Indian investors irrespective of their income level, education, occupation tend to be very conservative in their choice of investment product. From their study, they concluded that Indian investors prefer to invest mostly in risk-free investments.

Chaudhary (2013)states that investors tend to look towards purchasing an insurance policy as a financial product. Hence there is a low level of awareness of investment products in India.

Kumar (2006) studied investors in Bengaluru and Bhubaneswar. They concluded that investors in Bengaluru were well aware of the risk–return framework of the financial products. In Bhubaneswar investors were more conservative with little awareness and their preference leaned towards fixed deposits and small savings schemes.

Chaturvedi et al (2012)observed that the household investment in India has a dismal 10% in equity-related investments. They also observed that there are two sets of households, a) households with low income and low consumer durable penetration who invest in risky assets and b) households with a high level of income and high consumer durable penetration shunning from risky assets.

Annaveni and Archana (2017) found that there exists a relationship between annual savings and age. Insurance and pension schemes are the most preferred choices of investment and the main purpose of investment is a steady income and to earn high return within a short period. Investment behaviour has been extensively researched to understand what influences investment decision.

2.2.1 Investment Decisions

Investment decisions can be influenced by

a. Demographics of the investor (Age, Gender, Income, Occupation etc.)

b. Risk profile of the investor (Risk-averse, Risk neutral, Risk seeker)

c. Biases present in the Investor (Emotional Bias, Cognitive Bias)

Hemalatha (2019) did an exploratory study on investors in Chennai. Capital appreciation, tax benefit, expected return, liquidity, risk minimization, financial security were the features she considered for analysing.The author pointed out that these factors of selection vary according to the socio-demographics and concludes that level of computer knowledge and online trading capability are also other factors that determine investment behaviour.

Chavali and Mohanray (2016) studied the relationship between demographic and investment patterns. Their findings pointed out that gender is the most important factor affecting investment decision.

Barber and Odean (2001) conclude that women are more risk-averse than men. Men are overconfident which makes them frequently re-arrange their portfolio thus leading to diminishing returns.

Hon-snir et al (2012) did a study among portfolio managers in Israel. They found that women investors display biases like herding, availability bias and disposition much more than their male counterparts.

Mustapha and Imed (2014) studied behaviour biases present with investor behaviour in the Tunisian stock market. They concluded the persistence of behavioural biases but felt that their presence is not because of cyclical factors but structural factors closely related to a specific range of individuals.

Shaikh and Kalkundrikar (2011) confirmed in their study demographic factors like income, education, marital status of an investor are the most affecting factors in

the investment decisions and behaviour.

Fares and Khamis (2011) found that the education level of the investors in the Amman stock exchange is statistically significant to investment decisions.

Rizvi and Fatima (2015) conducted a study of the correlation between personality traits and investment patterns in the Indian stock market. They found a positive correlation between income and investment frequency.

Kulkarni (2014)identified that demographics factors play a key role in determining investment decision and behaviour.

Kabraet al (2010) posited that age and gender are the crucial factors that influence investor behaviour. Gender is another crucial factor in analysing investor behaviour.

2.3 Risk

The human's perception of risk is something very complex and has gone through extensive research by both economists and psychologists. The behaviour of being averse to any negative incidence is born in us right from the time we have come into the world. Humans as with animals have been trained in our senses to intuitively look for any danger that can affect our well-being (**Damodaran).** He further emphasizes the Duality of risk. He notices that individuals tend to seek risk in certain areas and at the same time they avoid risk in other areas.

Accordingly risk-taking as such differs in different domain and earlier it was classified into 4 domains. It was later (**Jackson, Hourany, and Vidmar (1972)** extended to the domains as physical, social, ethical, financial and health. It was also found out that individuals behave consistently within domains but not across

domains **(weber et al 2008).** For example, a person who rides a two-wheeler without wearing a helmet will exhibit the same attitude when it comes to driving a car by not adhering to the safety standards, i.e. he is a risk-taker in the physical domain by retaining the risk himself. However, the same person may or may not be a financial risk- taker. Within the financial risk tolerance domain, there are no sub-domains.

However, the aspect of risk is very subjective and varies from person to person and from time to time. Many a time we tend to look at the past, search for some confirmation and accordingly adjust for the future. Time and again we come across many uncertain events which end in an unfavourable experience even though the probability of its occurrence is very small.

The outlook towards risk is more of an intuition where the mind subconsciously develops certain patterns and attitude towards certain objects, outcomes or for that matter certain words and colours.

2.3.1 Risk aversion theories

2.3.1.1 The Theory of Utility by Daniel Bernoulli

The St. PetersburgParadox is a gamble game coined by Nicholas Bernoulli, which made his cousin Daniel Bernoulli to come with the Utility theory as a function of wealth. In his words "….the value of an item must not be based upon its price, but rather on the utility it yields". Extending the classical theory of diminishing marginal utility to wealth, he pointed out that a person's marginal utility decreases as wealth increases i.e. Utility for wealth increases as wealth increases but on a decreasing rate.

Table 2.3.Diminishing marginal utility of wealth

Wealth(Crs)	1	2	3	4	5	6	7	8	9	10
Utility units	10	30	48	60	70	78	84	90	96	100

From the above table, we see that from 1 crore to 2 crores the utility derived is 20 units but for the same amount of change in wealth from 5 crores to 6 crores it is 8 units and from 9 to 10 crores it is only 4 units.

For a person who is in the 2 crore slab, he will be risk- averse as the loss on utility would be 20 units but whereas when he becomes wealthy and if he is in the 10 crore slab he will be indifferent to a loss or gain of 4 units even though in both cases the loss is 1 crore.

This theory was widely accepted as it concurred with the fundamental economic principle and stood the test of time until two psychologists challenged the theory and new ideas on Behavioural aspects with regards to wealth werepresented.

2.3.1.2. The Ellsberg Paradox:

Daniel Ellsberg in 1961 formulated this theory in his book "Risk, Ambiguity and the savage axioms" (1961). It does not follow the Utility theory and contains Subjective probability theory.

A person is given an urn containing 90 balls out of which 30is known to be red and the rest 60 are either black or yellow. The person is asked to choose between the two gambles

A: 100$ if the ball is red

B: 100$ if the ball is black

And one among the following

C: 100$ if the ball is not black

D: 100$ if the ball is not red

In a majority of cases, the individuals will choose option A over B and option D over C. *"Better a known devil rather than an unknown angel".* The premise is that betting for or against known information is safer than betting for unknown information.

According to this paradox, these choices of preferences violate the sure-shot principle which requires the opting of A to B to be maintained in opting for C to D

2.3.1.3. The Prospect Theory

Daniel Kahneman & Amos Tversky agreed that even though wealth utility is in the classical economic model and widely accepted it had a core aspect missing in it. They felt that the utility theory compared the utilities of two states of wealth. They argued that a reference point from which the options are evaluated is missing in the theory of utility.

For example, X and Y each have 5 crores each; by the utility theory both of them are at the same level of utility. Now consider this, yesterday X had 2 crores and Y had 10 crores, Will they be at the same level? X has gained 3 crores and Y has lost 5 crores, X will be happy that he has gained and Y will be sad that he has lost 5 crores even though both of them have 5 crores.

This led to adding an aspect of value leading to the Prospect theory.

The theory deviated from the classical theory giving importance to the following attributes

a. Risk aversion & Risk seeking

b. Loss aversion

c. Framing

d. Non-linear preference

e. Source

The principle of loss aversion according to them is that when you directly compare losses and gains against each other, losses loom larger than gains.

From the below which choice will one chose

Case1: Get 900or 90% to get 1000

Case 2: Lose 900 for sure or 90% chance to lose 1000

In all probability, one will choose the sure thing in case1 and choose the gamble in case2. This is because in case1 he would rather get a sure gain rather than gamble it and in case 2 he would not want a sure loss and will be willing to gamble for it. That is, when he is faced with a loss he is more as a risk seeker and if faced with a gain he becomes more of a risk-averse person. This explains the behaviour of a typical investor buying a certain equity stock. If the price of the stock rises well above the cost he becomes risk averse and tend to sell it and if the price goes down he tends to hold on to losses with the hope of a reversal to the cost price exhibiting risk seeking attitude.

Table 2.4. Fourfold pattern of preference

Fourfold pattern of preferences

The four fold pattern is considered as one of the core achievements of prospect theory

	Gains	**Losses**
	A	B
	1.95% chance to win 1000`	1.95% chance to lose 10000`
High probability	2.Fear of Disappointment	2.Hope to avoid the loss
Certainty effect	3.Risk Averse	3.Risk seeking
	e.g. Investing in Debt inst	e.g. Holding onto losses
	C	D
	1.5% chance to win 10000`	1.5% chance to lose 10000`
Low Probability	2.Hope of a large gain	2.fear of large loss
Possibility effect	3.Risk Seeking	3.Risk Averse
	e.g. Lottery & Gambling	e.g. Buying Insurance

1. The Top row is an illustrative prospect
2. The second row is the emotion the prospect evokes
3. The third row is the Bias of an individual when offered the gamble
4. The last row is a possible example

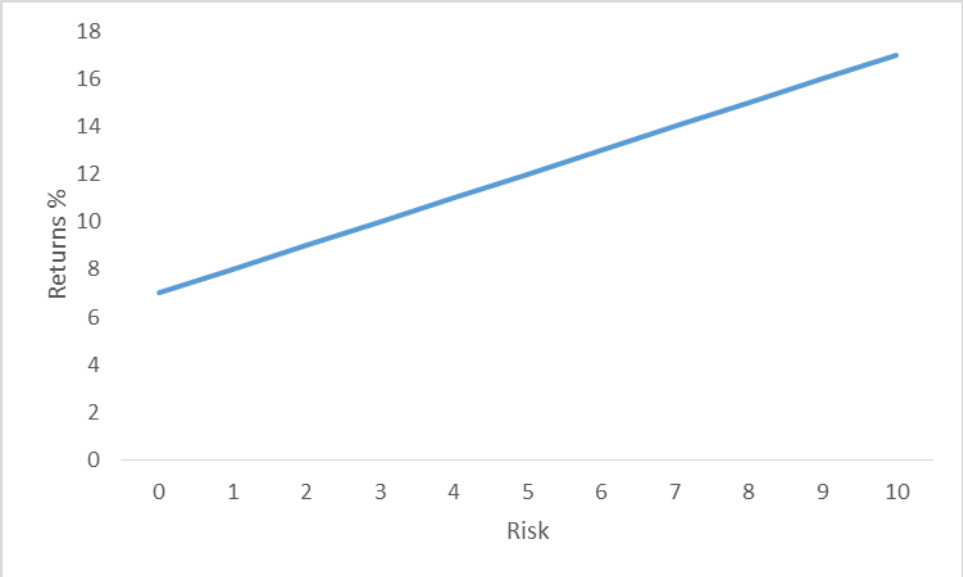
Source: Thinking, fast and slow. Daniel Kahneman

2.3.2. Risk and Returns

Any investment made is measured by the risk associated with it and the returns generated from that asset on account of taking that risk. Risk and returns are positively correlated i.e., as the risk of an asset goes up, so too is the expected return from that asset.

Sindhu and Rajitha (2014) pointed out that risk as such is present in all financial investments. This is because of the uncertainty in the expected and actual returns. Hence it becomes imperative to calculate the risk capability of the individual.

Fig 2.2 Risk-return trade-off in investment



In the above chart, an approximate return of 7% is taken as the risk-free return. As the unit of risk increases the return for the investment will also increase.

Government bonds are considered risk free and in India, the rates from the State Bank of India can be taken as a proxy for risk free returns though technically even the sovereign bonds issued by the government also have an element of risk as was seen in the crises in the European region. While someassets are considered mostly safe, the equity asset class is considered risky and is avoided by many. However, a detailed interpretation of the stock market's historical returns will help them to alter their views.

2.3.3. Socio–demographic Studies

The study of demographics is another important factor that must be considered in studying the risk tolerance of the investors

Sultana and Pardhasaradi (2011)posted that socio-demographic factors income, occupation and marital status are influenced by the risk taking capacity of the investor. They also noted that socio factor like literacy level also affects the risk taking capacity.

Anbar and Eker (2010) mentioned in their study that to analyse the risk tolerance level of the individual, apart from other factors socio demographic factors also play an important role.

2.3.4. Risk Profiling classification and measurement

Hallahan*et al*. (2004)stressed the need to do risk profiling. They found that when individuals self-assess their risk tolerance, it differs from the actual risk score.

Sulaiman (2012)states that risk tolerance need not be very complex. Risk capability needs to be looked at in a simple manner as they felt that maximising the expected utility should be the aim of any investment pursuit.

2.3.5 Risk attitude

It is more easer to measure risk attitude rather than defining it.

Saucier and Gerard (2000) note the ambiguity and lack of consensus in defining risk attitudes. In all the available literature available on this psychological trait, the following recurrent themes are identified. A. Diverse dimensions (opinions, beliefs, values), B. evaluations (like, dislike, preference), C. Objects (attractive ideas).

Sultana and Pardhasaradi(2011) aimed to investigate the relationship between socio-economic factors and the financial risk tolerance of individual investors. The

study concluded that Indian investors are conservative with 41% low tolerant and 34% being highly tolerant. Their analysis further revealed that marital status, earnings, occupation and number of dependents are significantly associated with risk tolerance.

Maccrimmon and Wehrung (1990) found that propensity to take risk is a multi-dimension construct. They distinguished three different types of risk propensity.

a) Behaviour in hypothetical risk situations,

b) Behaviour in naturally occurring risk situations,

c) Self-reported risk attitudes.

Cordell (2001) separates Investment risk tolerance into four categories.

a) Propensity (observed risk behaviour in naturally occurring situations,

b) Attitude (willingness to accept monetary risk) measured by hypothetical investment decision choices,

c) Capacity (financial capability to incur risk,

d) Knowledge (understanding the matrix of risk-return payoff)

2.3.6 Risk Tolerance and Personality traits

Personality studies are widely accepted to be relevant to economic studies.

The relevance of personality to the economy is well brought out by **Borghans et al (2008).** They pointed out that economists are not the only ones to be interested in the description, prediction, and explanation of human behaviour and as such

psychologists have also approached these challenges. They posited that economists can very well leverage from psychology research in measuring and predicting personality traits organized in the widely accepted Big Five taxonomy.

The most accepted taxonomy for personality is the Big Five Personality traits also known as the five- factor model (FFM). The FFM is widely adopted for researches in all types of studies.

(Gosling and Swann 2003) states that the personality traits can be grouped into five major factors and as such the differences between individuals can be classified within the five dimensions

Big Five personality traits:

1. Openness to experience (creativity)
2. Conscientiousness(dependable, responsible, systematic)
3. Extroversion (talkative, sociable, lively, assertive)
4. Agreeableness(ability to get along well with others)
5. Neuroticism (ability to withstand stress)

Sreedevi et al (2011)analysed the influence of personality traits on investment decisions. Along with the big five factors, they included risk and return factors that influence the investment choices. Their results amplified the fact that personality traits are more influential than risk and return factors on the investment choices made by the individuals.

Brown (2001) in his study on the influence of personality traits on debt and financial instruments decision found that extraversion has acontrary result on the holding pattern of financial assets. They pointed to the fact that the family's exposure to debt and financial products is influenced by the traits of extraversion and openness.

Nicholson et al (2002)studied on the effect of personality traits on riskawareness. They found that high scores of extraversion, openness to experience and low scores for neuroticism, agreeableness, and conscientiousnesswere associated with the tendency to take the risk.

Rustichini et al (2012) examined the relationship between personality traits and economic preferences. Their results showed the presence of neuroticism traits in risk taking in the domains of gains. However, it was absent in the domains of losses.

2.3.7 Is risk taking situation specific or cross situational.

Many studies have been conducted to find out if risk taking is specific to situations or is it a cross situational disposition. Alternately studies have been conducted to see if there is a consistency in risk attitudes or behaviour and if any particular trait can be fixed as common across risk taking situations.

Many researchers argued that risk taking behaviour is a general personality trait and tried to find out the evidence for common patterns across risk taking situations. **Eysenck and Eysenck (1978**) tried to establish the above fact but were not able to come up with any concrete evidence to support the claim.

Zuckerman (1983, 1994) Marvin Zuckerman observed sensation seeking as a general trait for risk behaviour. In his words ‘‘the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences’’. He believed that this particular trait could predict financial risk taking behaviour.

Wong and Carducci (1991) did a study with students and found out that students with a greater level of sensation seeking traits have greater risk taking tendencies when it comes to taking every day financial decisions.

Slovic (1964) tried nine different measures of risk taking across different domains. He noted that there exists no correlation between the various measures spread across the different domains.

Kogan and Wallach (1964) examined the relationship among a wide variety of risk measures like actual betting situations, choices among lotteries based on motor skill tasks. Their research did not provide any evidence of general risk taking behaviour across the domains.

Weber et al (2002) measured risk in five different domains like financial (investing and gambling separate constructs), health/safety, ethical, recreational, and social decisions. They posted that their results strongly implied that risk taking is very specific to domains. The Dospert (Domain specific risk tolerance test) scale is well received and used even now by researchers.

Marcus (2004) stressed the fact that risk aversion changes as per time. This is because habits may change over time and the consumption pattern of the individual can change. Also, the individual commitments and goals keep changing according

to different stages of life.

2.3.8 Objective and subjective Risk tolerance

Various studies on risk tolerance have used either subjective measure or objective measures. The commonly used method is to have a combination of both to measure the risk tolerance of the subject.

Objective risk tolerance is measured as the ratio of risky financial assets to an individual's total wealth

Subjective risk tolerance is measured by the individual's responses to questions about their Risk tolerance

Grabble Slytton (1998) investigated the relationship between age and subjective risk tolerance. The study shed light that there is an inverse relationship between age and subjective risk tolerance. Individuals tend to have high scores when young and low scores when they get old.

Chang et al (2004) did a study on the determinants of subjective and objective Risk tolerance. Education, race, employment were determinants of both subjective risk tolerance and objective risk tolerance. Moreover, they pointed out that subjective risk tolerance positively influenced objective risk tolerance

Hanna and Chen (1997) differentiated subjective risk tolerance and objective risk tolerance. They state that the effect of objective risk tolerance is based on the investment horizon and the ratio of the household's financial assets to total wealth. Investors relative risk aversion is used to investigate the effect of the subjective risk tolerance

2.3.9. Measures of Risk tolerance:

Numerous studies and research have been done and many practitioners and researchers have called upon the need for the application of formal procedures but there is no clear agreement on how best to administer it.

At the broadest level, we can differentiate between actual behaviour and performance using questionnaires, simulations etc.

Hanna et al (2001) enumerated four different types to measure risk,

a) Investment choice measurement,

b) A combination of investment and subjective questions,

c) Hypothetical risk questions,

d) Measure of actual behaviour

Researchers use either one or a combination of the above to establish risk tolerance levels

Blanco et al (2012) tried to discover if there is a consistency between measures of risk tolerance. They identified three measures, first measure used by **Grable and Lytton (1999**), second measure from **Barsky et al (1997)** and the third **Survey of Consumer finances** on risk tolerance. They found out that the scores were inconsistent across the three measures and suggested further research on subjective risk tolerance.

Barsky et al (1997) conducted a study for economic sceptics about subjective questions on risk taking. They assessed risk tolerance for different behaviour like

smoking, drinking, having on health or life insurance, holding stocks or other risky assets. They posted that for each behaviour they investigated, the risk tolerance measure made qualitatively correct predictions.

2.4.Overview of Behaviour finance

Traditional finance is built on the foundation of *Homo Economics* or Economic Man. It is the portrayal of man as an agent who is consistently rational, narrowly self-interested and who optimally pursue their subjective ends.

The traditional theories of analysing the market behaviour weremodelled using these assumptions of rationality and perfect information dispensation.

The assumptions on which the theories were framed:

1. The investors are rational in their decisions
2. The market always absorbs the information available
3. The prices of the securities as such reflect the information available in the market

The Efficient Market Theory (EMH)states that in an efficient market all the information available is absorbed by the market and the investors use this information to behave rationally and logically.

The EMH was categorised into three

1. Weak form: The historical information is reflected in the price of the security and hence the price does not take the past into account. It takes a

random walk based on demand and supply

2. Semi strong form: In this form not only the historical info is reflected in the price but the publicly available information (corporate reports, financial statements)is also reflected in the price. Thus a person cannot earn abnormal returns because the information is available to all

3. Strong form: Apart from the past information and publicly available information, this form states that even insider and hidden information is of no use to make abnormal returns because of the transparency and full disclosures.

However, humans tend to act differently in the face of uncertainty as is their animal instinct to avoid danger and look for other opportunities for survival.

Amlan (2016) lists out the shortcomings of the classic theories as found by theorists in support of behavioural theories. Some of them are

a. Concept of rationality,

b. Role of emotion in investments,

c. Informational accuracy,

d. Demographic factors

Behaviour finance substituted the classical theories which were based on rationality assumptions. Supporters of Behaviour finance argue that investors are irrational and as such make decisions based on the certainty of the situations and the biases which they have inculcated. Behaviour studies show that investors seldom make decisions logically and tend to mostly make decisions emotionally.

Kahneman and Tversky (1979) in their paper "Prospect theory: An analysis of decision under risk" explain how the investors make decisions based on the alternatives involving risk when the probable outcomes are known. They said that investor perceives losses and gains differently. They pointed out that losses loom large than the potential gains in the minds of the investor.

The Prospect theory as such challenged the efficient market theory and paved a lot of research work to be done on the new stream of Behaviour Finance.

Shiller (2003) mentioned in his elaborate review of literature that the answers to most of the doubts of the efficient market hypothesis with regards to the irregularities of investor pattern are found in behaviour finance.

2.4.1 Theorists view on Behavioural finance (BF)

Riccardo (2000) "Essentially behaviour finance attempts to explain the what, why and how of finance from a human perspective"

Olsen (1998) "Behaviour finance seeks to understand and predict systematic financial implications of psychological decision process"

Belsky and Gilowich (1999) combined psychology and economics to explain why and how people make irrational and illogical decisions

Shefrin (2001) studied how psychology affects financial decision and financial markets

Frankfurter and McGoun (2002) express BF "as a part of behavioural economics, is that branch of finance that, with the help of theories from other

behaviouralsciences, particularly psychology and sociology, tries to discover and explain phenomena inconsistent with the paradigm of expected utility of wealth and narrowly defined rational behaviour. “

Marchand (2012) identified the biases of investors and compared both the traditional and behavioural theories.

Antony and Nar (2015) believe that behaviour finance is not a replacement for traditional finance theories but can co-exist in trying to understand the irrational behaviour of the investors.

The main characteristics found in the behaviour of investors according to Shefrin (2000) are

1. Greed

2. Fear

Greed is one characteristic that tends to dominate the psyche of a person from time immemorial. As such, investors tend to throw caution to the wind of logic by getting into speculative investments to make quick money.

Another important characteristic is Fear. Fear is inculcated in a person due to a variety of reasons and operates varyingly under different circumstances, events, conditions etc. Investors get caught with the fear of losing money and don’t stay invested when logic and rational thinking takes a back seat. Thus, missing out on a lot of opportunities to make money.

Pompian (2006) classified Behaviour finance into two-

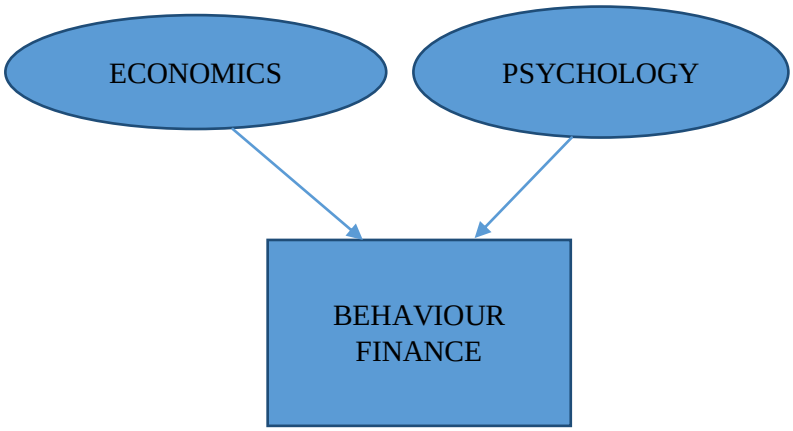
1. Behaviour finance Micro: examining behaviour and biases of investors that sets them apart from the rational actors in the classical economic theory.

2. Behaviour fiancé Macro: Detects and distinguishes the abnormalities in efficient market theories like calendar anomalies.

Schindler (2007) list the three main cornerstones of Behavioural finance

- Sociology: studying human social behaviour
- Psychology: studying the behaviour and mental processes
- Finance: discipline concerned with money-making decisions

Fig 2.3 Behavioural finance



Deshmukh and Joseph (2016) "The concept of Behavioural finance is an integration of social, economics, and psychology."

Gilowich and Griffin (2002) state that the study of behaviour finance is needed when investors make irrational decisions applying in their investing, spending and borrowing.

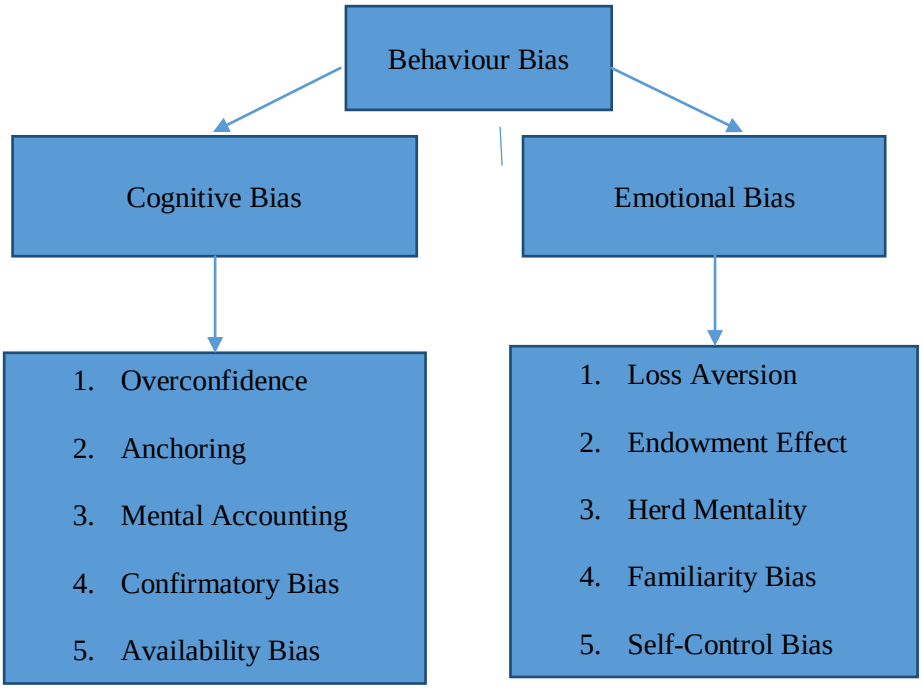
Barberis and Thaler (2003) indicated that markets are divided between rational

and irrational investors. They stated that the equilibrium of the market set by the rational investors is disturbed by the behaviour of the irrational behaviour of the investors thus balancing the market impact

2.4.2 Behaviour biases affecting Investor behaviour

Pompain (2006) classified behaviour biases into two as Cognitive deviation and Emotional deviation. Both these bias result in irrational choices and judgements. Cognitive deviations are the result of faulty reason and logical errors whereas emotional deviations happen because of intuitions.

Fig 2.4 Behaviour biases



Source: based on the literature review done

2.4.2.1Cognitive Bias:

Cognitive biases that affect decision making is based on conventionalideas that may or may not be accurate. A rule of thumb is an example where investors tend to

follow in investing which may or may be appropriate for them. As such because of the cognitive bias present, individuals tend to take short cuts, become overconfident and try to oversimplify in their decision making.

Hazelton and Andrews (2005) define Cognitive bias as a systematic pattern of deviation in judgement from the actual norm. **Bless and Strack (2004)** states that individuals construct their own social reality from their understanding and perception which dictates their behaviour**. Kahneman and Traversky (1972)** point out that cognitive bias may lead to inaccurate judgement and illogical interpretation which is called irrationality**. Kahneman and Traversky (1972)** argue that cognitive biases have efficient uses in areas like entrepreneurship, finance and management.

2.4.2.2 Emotional Bias:

Emotional biases influence decision making based on feelings leading to irrational behaviour at that point in time. They can also be some deep-rooted personal experiences that can influence investment decision making. It is all about how one feels and how at that point one reacts. As such they are ingrained in the psyche of the investors and it very difficult to overcome them, unlike the cognitive bias. However certain emotional biases can be very useful in the decision making process.

Michael M. Pompian and John M. Longo(2004)recommend a two-step process when dealing with investor Biases.

a) Adapt

b) Moderate

In one of the propositions in dealing with investor biases, they feel that if the

investor has a cognitive bias then they can be moderated and brought to reason but if they fall in the emotional bias category then they need to be adapted. That is to say, the advisor needs to accept the bias unconditionally rather than jeopardizing the client emotionally.

Daniel Kahneman in his book **"Thinking, fast and slow"** explains the two systems 1 &2. System 1 is the intuitive one where we are all conditioned by our past beliefs, ideologies etc. and hence we behave in a particular manner. This is where all behavioural biases like loss aversion, risk attitudes are formed. System 2 is the rational one where all the shortcomings of System 1 can be overcome by reasoning.

Choice Architecture and Choice architect became very popular after being published in the book "Nudge, Better decisions for Health, Wealth and Happiness" authored by **Richard Thaler and Cass Sunstein.**

According to them, people don't make choices in a vacuum; they do so in an existing environment where there are many choices and features to the choices. These features which influence their decisions can go either noticed or unnoticed. A person who creates that type of environment where the decision-makers are nudged to make better choices is known as Choice Architect.

2.4.3 An overview of the various Biases taken up in this study

Overconfidence Bias is the tendency of people to have overconfidence in their own abilities in driving, cooking etc. Investors tend to have this bias when investing and trading in the stock market having the sense that all gains and profits earned are by their own superior skills and knowledge. This bias needs to be addressed because investors are at their own peril if they ignore the other market factors which are

influential in earning returns on their investment. Also with high confidence levels, the subjective confidence is relatively higher than the objective accuracy of decisions taken.

Anchoring Bias: Anchoring or focalisim as per psychology occurs when people blindly rely too much on the first information they get to arrive at a decision. Eventually, all subsequent decisions tend to be taken based on the initial information. Anchoring bias was first introduced by **Tversky and Kahneman** (1981). Anchoring in investment and trading is using the price of a security as a benchmark for making decisions. As a result, investors tend to stick to investments that have lost their value below its fundamentals hoping that the price will revert to their original price. There are endless uninformative anchors which directly or indirectly affect the judgment **Wilson, Houston, Brekke & Etling (1996)**.

Anchoring bias can be noticed when investors refer to historical prices, in relative valuation metrics like Price to earnings, Price to book value, and the Rule of the thumb methods etc.

Mental accounting: In 1980 **Richard Thaler** came with the bias called mental accounting. He pointed out that people tend to code, categorize, analyse and evaluate their assets into separate mental accounts. As such, people put money into different accounts according to their financial behaviour. In their mind, a particular asset bought need to be assigned to an outcome which may occur in the future. People tend to keep buying gold as an investment for their children's wedding in Chennai, India. Separate mental accounts could be maintained for vacation, retirement, House construction etc. **Gopalakrishnan** (2012) points out that over time people tend to be hard hit by this bias. **Pompian** (2011) says that investors

suffer a lot due to this because their rational mind is mentally categorized. He further adds that these options only entice the investors but in effect, these choices are not optimal as they look.

Confirmatory Bias: According to **Pious** (1993) confirmation bias is the tendency to search, interpret and recall information in such a way that it confirms a person's earlier decision. Generally, people make decisions based on the information they got or as per their preconceived notion. However after the decision, they tend to seek information and adjust them favourably to confirm their decision. Because of this bias, they tend to seek only the information that is in line with their decisions and as such losing on the actual information which could be very valuable.

Availability Bias:Tversky and Kahneman (1978) studied this heuristics and Biases present in a person when making a decision. They labelled this particular bias as Availability bias under heuristics. According to them, people process information in a way they are effortlessly recalled from memory. Availability bias occurs when deciding due to the readiness of examples available to an individual based on his information and experience. As such, people tend to rely on easily available information to confirm their beliefs on anotherwise distant concept. **Esgate and Groome(2005)** point out that the availability heuristics works on the notion that if any information needs to be recalled then it must be important or at least more important than other available information. As such people tend to make decisions based on recently available information **Phung** (2009).

Loss Aversion bias: is the person's tendency to prefer avoiding losses to acquiring gains. **Tversky and Kahneman** identified this bias existing among people and suggested that losses are twice more powerful than gains psychologically. It

implies that one who losses 100 Rs. will feel for it more than the one who gains 100 Rs. The concept of loss aversion has been challenged in recent times by several studies. **Mukherjee et al** (2017) did a study on the effect of losses in decision making under risk and uncertainty. They observed that loss aversion bias was absent in his study. **Gill and Prowse (2012)**further explain the nonexistence of loss aversion occurring due to small payoff magnitudes. They termed it as amagnitude dependent loss aversion. According to them, the utility of the monetary payoff depends on the previous experiences which determine the difference between loss aversion and risk aversion.

Endowment Biaswas first proposed by **Kahneman et al** (1991).By this bias, an individual is likely to price more for an asset he owns than for an asset he does not own. Also, the price is willing to pay for the same asset will be much less than the price of the asset he owns. This can be equated to the behaviour model **WTP**, Willingness to pay. As such investors tend to retain their assets even in terms of crisis as it was found that the price they want to sell was much more than the objective market price. Kahneman et al (1991) argued that because the WTP is not equal to the WTA (willingness to accept), it violates the Coase theorem and is inconsistent with the standard economic theory.

Herding Bias: Influences the individual to make decisions based on what the majority of people do. As such, social influence is at the root of herding whether it is new information, observed behaviour from a group, peers or the words from a popular leader. In investment, it refers to the investor's tendency to mimic the crowd rather than rely on their own judgment leading to bubbles and crashes in the market. **Vernon Smith (1990)** points out that regardless of the markets they exist,

social influences are the roots of all bubbles and crashes. **Merli and Roger (2013**) list three reasons for herding behaviour. 1. Payoff externalities. For example, investors are more likely to trade at the same time to benefit from a deeper liquidity in the market, 2. Reputational concerns and issues relating to the principal-agent theory, for example when the performance of a fund manager is assessed relative to a benchmark the manager will try to mimic funds that post good returns, 3. Informational externalities, investors tend to acquire information by observing the actions of the other participants. **Ankith et al (2017**) pointedout that herding behaviour is the most common behavioural bias that impacts financial markets in India. Their study showed that herding behaviour is prevalent among investors when most of the information is got word of mouth. Also, male investors were more biased towards herding than their female investors.

Familiarity Bias: **Tversky and Kahneman**discover this bias as originating from the availability bias. They pointed out the likelihood of events is estimated by the number of examples of such events coming into mind. Thus they pointed out that this bias is an extension of the availability bias related to the ease of recall. **Ashcraft** (2006) defines familiarity bias as judging events as important because they are more familiar in memory. However, Ouellette and Wood (1998) point out that this bias may occur only when the person is habitual and if it occurs in a stable context within the situation. Wyer 2000 concludes that past behaviour influences current behaviour and that it inherits from other differing means. In investment, Investors tend to stick to those assets which are familiar to them. They will not venture into other investment avenues even though the returns may be promising as they are not familiar with them.

Self-control Bias: **Shefrin,** (2000)

"Self-control means controlling emotions. Some investors value dividends for self-control reasons as well as for reasons that stem from hedonic editing"

This bias stems from a lack of self-discipline behaviour. In investing parlance, it means not able to curb current expenses for the sake of saving for tomorrow. Because of this lack of discipline, investors tend to take a huge risk to catch up leading to undue stress and the possibilities of losses**. Thaler and Shefrin(1981)** in their research paper on self-control state that the shape of the income stream will affect the type of saving strategy adopted. They pointed out that those individuals who do not have a stable income may find it difficult to have the self-control to save for any financial goals. Without a mandatory saving plan, they would have to adopt some more complex strategy to save effectively. Also with the case of individuals whose income is expected to decline over time like professional athletes and sports persons, who may save a large proportion of their high current income for their future needs.

Table 2.5 Summary of the Literature on Various Behavioural Biases

Bias	Author(year)	Journal of publication
Overconfidence	Odean(1999) Daniel etal.(1998)	The American EconomicReview Journal of Finance
Anchoring	Croson andSundali (2005)	Journal of Risk andUncertainty
Mental accounting	Thaler(1999) Barberis andHuang(2001) Kahneman and Tversky(1979)	Financial Analysts Journal Journal of Finance Econometrica: Journal ofthe Econometric Society
Confirmatory bias	Pious et al (1993)	The psychology of judgment and decision making. New York: McGraw Hill,
Availability bias	Tversky and Kahneman (1973)	Cognitive psychology
Loss aversion	Gill and Prowse (2012	American economic review
Endowment effect	Kaheneman et al (1991)	Journal of economic perspectives
Herd mentality	Lakonishok etal.(1992) Scharfstein andStein (1990) Christie andHuang(1995)	Journal of Financial Economics The American Economic Review Financial Analysts Journal
Familiarity bias	Review Massa andSimonov(2006) Shefrin andStatman (1985)	Review of Financial Studies Journal of Finance
Self-control bias	Croson andSundali (2005)	Journal of Risk andUncertainty

2.5 Gaps and limitations from the literature review

In this section, the gaps and limitations observed in the literature review are presented to outline the objectives and to draw the conceptual framework for the research. This will be a guideline to formulate the hypotheses which are conceptually related to one another. The detailed review of the literature done in the previous chapter provided the needed constructs that helped in identifying the research gaps for the study. This section begins with the gaps and limitations observed in the literature review followed by an outline of the study objectives and proceeds with the description of various constructs of the conceptual framework. The development of research hypotheses is done according to the conceptual and empirical findings of the risk tolerance and behavioural finance literature.

The following gaps in the existing studies were identified while reviewing the literature. The gaps found in the literature of behavioural finance and risk profiling studies serve as a strong base for undertaking the present study.

1. Most behavioural finance studies have been conducted in developed countries. There are also studies conducted in developing countries including India but they are very few. (Daniel et al., 1998; Barber and Odean, 2001; Barber and Odean, 2000; Odean, 1999; Odean, 1998; Grinblatt et al., 1995 and others). The literature on behavioural finance and risk profiling conducted in developing economies specifically in India is limited. Thus, the findings of these studies may differ in the Indian context especially in Chennai which is considered to be conservative. This is mainly because of differences in culture, lifestyle, saving and spending habits of individuals, risk attitude etc. Therefore it presents ample scope

to examine the relevance of Risk profiling and behaviour biases theories in emerging markets.

2. Literature review indicates that major focus has been given to the study of risk profiling limited to investment behaviour in the stock market. This is the same with the study of behaviour biases limited to the stock market behaviour both globally as well as in India. Few studies have been done keeping in mind other investment avenues.

3. From the literature review on behavioural finance, a lot of studies were reviewed on biases that affect the investment decision. It has been observed individual biases were studied with their impact on stock market decisions like overconfidence bias, disposition effect, herding, home, loss aversion, and anchoring and regret aversion bias. These biases were more frequently empirically tested because these behavioural biases usually affect individual investor's behaviour. Studies on other biases like familiarity, mental accounting, availability bias, self-control were very limited. Therefore, there is scope to explore the effect of these additional biases along with the frequently tested behavioural biases in investment decision making.

4. As mentioned, these biases were studied individually and there are but a handful of studies on emotional bias and cognitive bias together. Thus there exists an opportunity to identify which group of bias either emotional or cognitive is more influential in investment decision making.

5. The review of the literature points out to many of the studies investigating the influence of various demographical factors (gender, age, income, experience, education) on risk profiling and behavioural biases in investment decision making It

will be interesting to study if these investment decision influencing socio-demographic variables are in norm with the existing study.

6. A majority of studies on behavioural biases and socio-demographic variables is done with secondary data from institutions. In the United States of America, the Survey of Consumer finance helps to identify the type of risk profile and investor behaviour. This study aims to investigate on primary data with a self-constructed questionnaire designed with the help of investment experts.

7. Few studies have been done to investigate the relationship between risk profile and behavioural bias of the individual investor. No study has been done to explore this relationship between the factors in Chennai. Thus it will be useful for academicians and investment experts if the study brings out this relationship.

2.6Summary

This chapter describes the literature on risk profile, investment attitude and investment behaviour. This chapter is presented based on the empirical literature available on risk profiling and investors' behavioural factors. An overview of risk was presented in this chapter supported by enough literature on risk attitude, risk measurement, etc. From the various behavioural studies reviewed it has been found that not many behavioural studies have been done in India and Chennai. It was found that risk profiling in India especially in Chennai is in a very nascent stage. Also, the literature on the various socio-demographic factors affecting investment decision and risk profile both globally and in India was discussed. Based on the literature review it can be concluded that there exists a strong relationship between risk profile and investment behaviour with socio-demographic factors as an influencer in decision making.

CHAPTER 3

RESEARCH METHODOLOGY

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

Research Methodology stipulates anorderly way of resolving a problem. It involves an orderly process of gathering, recording and analysing data toarrive on research findings. This chapter details the research methodology of the current study. It begins with the objective of the study and the research questions followed by the hypothesis development. Research design for the study and the research design elements is discussed followed by a detailed discussion on the research purpose, research approach, strategies adopted for this study. The subsequent section discussesthe population, sample frame, sample size and data collection procedure for the study. Finally, this chapter discusses the questionnaire design and contents and concludeswith the findings from the pilot study.

3.1Objective of the study

The main objective of the study is to understand the risk tolerance level and biases associated with the investors and see if it is in line with findings done earlier. Also among the biases, the study aims to group the biases into emotional and cognitive and is the most domination bias among the individual investors in Chennai. The study also aims to find out the role of the behavioural biases and the risk tolerance of the individual in his or her investment choices.An investment choice response helps to identify the Investor behaviour and the study looks if the risk profile and Investor behaviour match. The study would be incomplete if the socio-demographic factors are not studied in relation to the risk profile and behaviour bias of the investor.

3.1.1 Outline of the Objectives

- Is the risk profile influenced by the socio-demographic factors of the investors in Chennai?
- Is the investment behaviour of the investor influenced by his risk taking ability?
- Do behaviour biases influence investment behaviour significantly?
- Do behaviour biases significantly influence risk taking ability?
- Identifying the role of the mediating variable between the independent variable and the dependent variable

3.2 Conceptual framework for the study

A conceptual framework is drawn from the objectives and is used to illustrate how the variables relate to each other (**Bas swaen** 2015).

Based on the information and gaps identified in the literature review, the conceptual framework was developed. The conceptual framework for the study is developed based on gaps identified from the literature review done.

Individual investors are vulnerable to various behavioural anomalies which in turn becomes a barrier to wealth creation, preservation and maximization. Daniel et al. (1998). Therefore, it is important to understand an individual's propensity to display different behaviour and their impact on the investment decision. It is also important to understand individuals risk tolerance when making investment choices.

The theoretical model below (fig 3.1) is developed from the various behaviour theories reviewed for the current study. Since behaviour biases in the current study display both subjective norms and attitudes, this model in this study has only two components with the risk perception construct as the perceived control component.

Fig 3.1: Theoretical model based on Behaviour theories

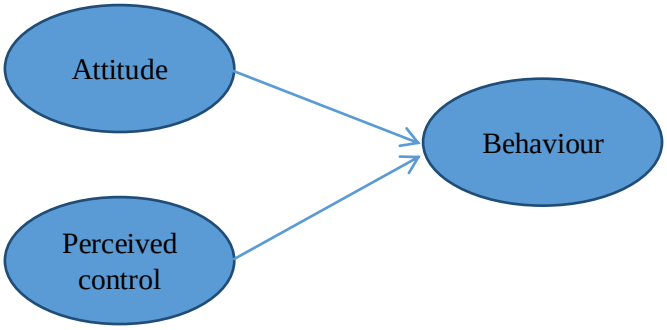
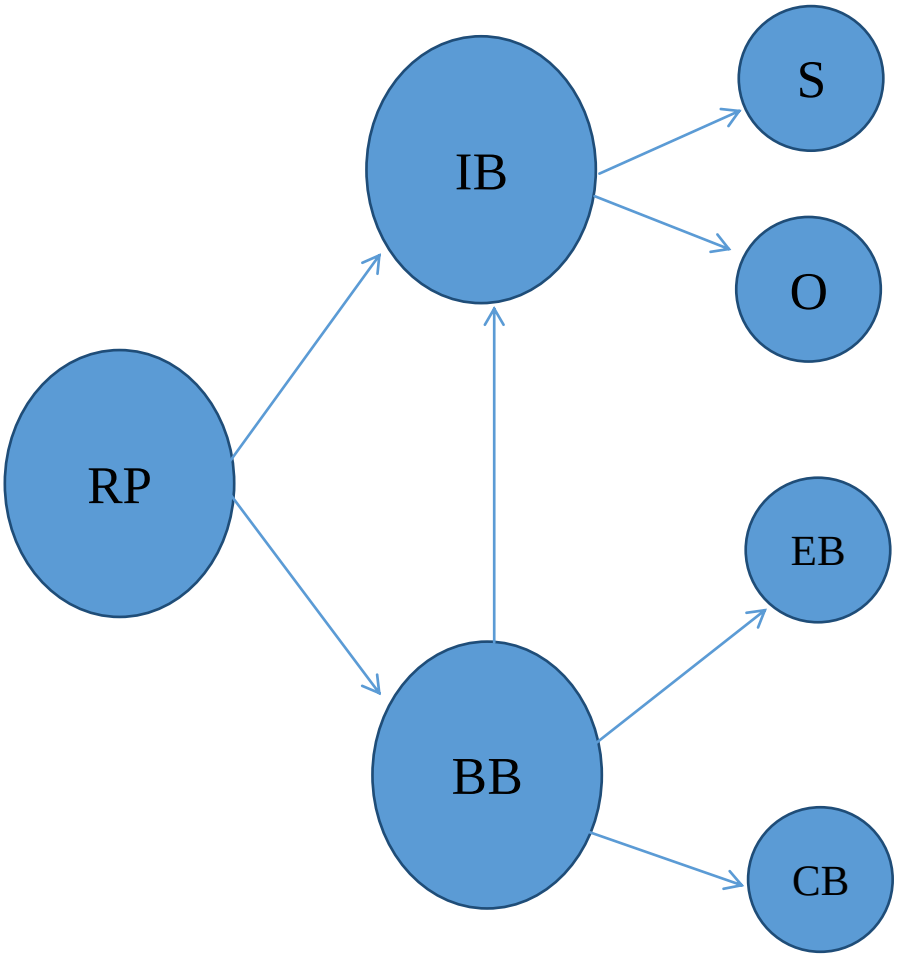


Fig.3.2 Conceptual model of the study

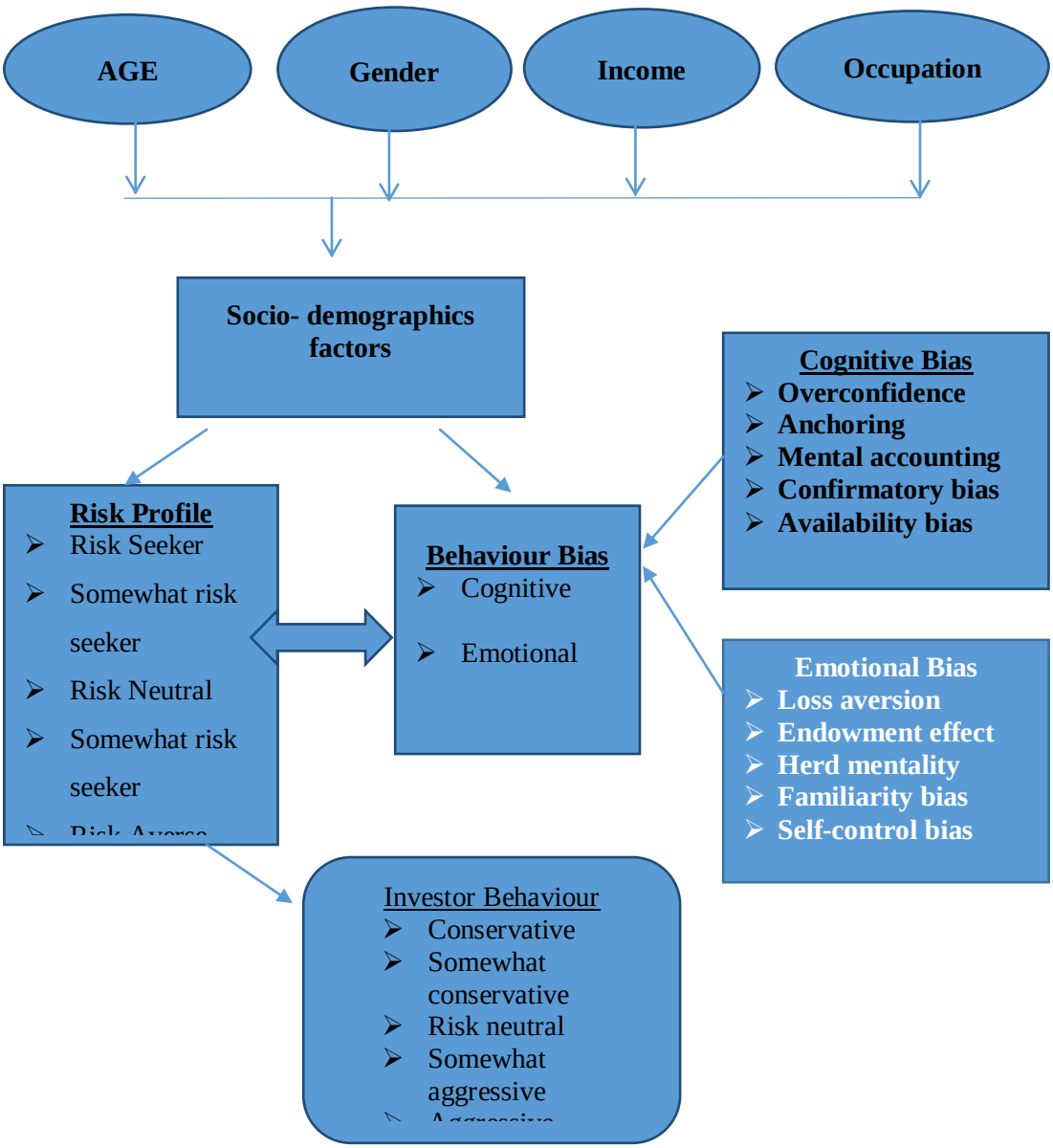


Note-RP: Risk profile, BB:Behaviour bias, IB: Investment behabiour, EB: Emotional bias, CB: Cognitive bias, S: Subjective, O: Objective

The study aims to analyse the relationship between the Risk profile and Investment behaviour of investors as shown in fig 3.2. Based on the literature survey,

Investment behaviour as such can be measured subjectively and objective.i.e. from their actual investment preferencesand their choices to hypothetical questions. From the literature review it was found that there are many factors that can affect investment behaviour with behavioural biases being the most prominent among them. Hence, for this study Behaviour bias is taken as that factor which can influence investor behaviour with Emotional bias and Cognitive bias as its components

Fig 3.3: Conceptual framework of the study



Source: based on the literature review done

The conceptual framework (fig.3.3) presents the outline of the current study.It examines the relationship between risk tolerance, behavioural biases and socio-demographic factors. The risk profile of the investor is classified into risk seeker, neutral and averse while the bias of the investor is classified as biased, neutral and unbiased. Among the socio –demographic factors, age, gender, income and occupation is taken to see if the influence the bias and risk attitude of the investor.

3.3 Research Questions

The research questions involving the risk tolerance and behavioural biases of individual investors are asfollows:

1. What is the risk tolerance level of individualretail investors in Chennai?

2. What type of behavioural biases do the individualretail investors in Chennai exhibit?

3. Do socio-demographic factorsinfluence behavioural biases among the individual investors in Chennai?

4. Do socio-demographic factorsinfluence the risk tolerance of individualinvestors in Chennai?

5. Is there any relationship between the risk profile and behavioural biases of theindividualinvestors in Chennai?

6. Does the risk profile of the investor influence the decision in choosing investment products?

3.4 Hypothesis development

A Hypothesis is an uncertain proposition or assumptions on the expected relationship between two or more variables. These assumptions are made and tested to accomplish the objectives identified in the study. The theoretical model framed by the researcher forms the base for developing the hypothesis

Accordingly, the hypothesis for the current study was developed based on the research objectives outlined at the beginning of the chapter. This study examines the risk propensity andthe effect of behavioural biases in investment decision making.

Socio demographics influence on risk taking ability, behaviour bias and investment decision

A. Socio-Demographic factors like Age, Gender, Income, Occupation does not influence the risk taking ability of the Investor

The influence of socio demographics factors plays a huge role in investment decisions. A lot of research has been done globally and in India to prove the highly correlated influence of socio-demographic factors on the risk profile of the individual investor, behaviour bias of the individual investor and the individual investor's investment decision choices.

Age

H_0 : Age does not influence the risk profile of the investor

H_1 : Age influences the risk tolerance of the investor

Gender

H_0 : Gender does not influence the risk profile of the investor

H_1 : Gender influences the risk tolerance of the investor

Income

H_0 : Income does not influence the risk profile of the investor

H_1 : Income influences the risk tolerance of the investor

Occupation

H_0 : Occupation does not influence the risk profile of the investor

H_1 : Occupation influences the risk tolerance of the investor

B. Socio-Demographic factors like Age, Gender, Income, Occupation does not influence on the behaviour bias of the investor

Age

H_0 : Age does not influence behaviour bias of the investor

H_1 : Age influences the behaviour bias of the investor

Gender

H_0 : Gender does not influence the behaviour bias of the investor

H_1 : Gender influences the behaviour bias of the investor

Income

H_0: Income does not influence the behaviour bias of the investor

H_1 : Income influences the behaviour bias of the investor

Occupation

H_0: Occupation does not influence the behaviour bias of the investor

H_1 : Occupation influences the behaviour bias of the investor

C. Socio-Demographic factors like Age, Gender, Income, Occupation does not determine Investor behaviour

Age

H_0 : Age does not determine the Investor behaviour

H_1 : Age determines the Investor behaviour

Gender

H_0 : Gender does not determine the Investor behaviour

H_1 : Gender determines the Investor behaviour

Income

H_0 : Income does not determine the Investor behaviour

H_1 : Income determines the Investor behaviour

Occupation

H_0 : Occupation does not influence the risk profile of the investor

H_1 : Occupation influences the risk tolerance of the investor

D. Relationship between Behaviour biases and Investor behaviour

H_0 Behaviour biases do not determine Investor behaviour

H_1 Behaviour biases determine the Investor behaviour

E. Relationship between Risk profile and Investor behaviour

H_0 Risk profile does not determine Investor behaviour

H_1 Risk profile determines the Investor behaviour

F. Relationship between Behaviour biases on the Risk profile of the investor

H_0 Behaviour bias of the investor do not have any relationship with the risk profile of the investor

H_1 Behaviour bias of the investor has a relationship with the risk profile of the investor

G. Mediating role of independent variables and the dependent variable

H_0 Risk do not play a mediating role between Bias and Investor behaviour

H_1 Risk play a mediating role between Bias and Investor behaviour

I. Relationship between risk and actual investment behaviour

H_0 Risk taking ability does not influence the investment preference

H_1Risk taking ability significantly influence the investment preference

3.5 Research Design

A research design is a detailed plan of the investigation on the concernedproblem.

The purpose of the study is to identify the risk profile and behavioural bias of retail individual investors in Chennai and to find out their influence on the investment decisions. The investment decision is the dependent variable on the independent variable behaviour bias; the risk profile is taken as the other independent variable. As such, the research design for this particular study is *correlational* as it attempts to determine the relationship between the variables and also it is *causa*l because it tries to explain the effect of the independent variables on the dependent variable.

3.5.1 Research Design for the Preliminary Study

The present research used semi-structured interviews in the initial stages of the study. Focus group discussions (FGD) were conducted face to face with open-ended questions to collect preliminary information from financial advisors, mutual fund agents, insurance agents and real estate agents.

For the FGD, non-probabilistic sampling like purposive sampling was used to select the participants. As per the qualitative approach, it was proposed to conduct the study till repeated observations were made and the study could be stopped when it was felt that no new and additional data could be got. The questionnaire for the pilot study was developed based on the inputs from the FGD.

3.5.2 Research Design for the MainStudy

Based on the findings from the qualitative study conducted with the industry experts and also from already established studies done on risk profiling and behaviour bias, a structured questionnaire was framed.

The validity of the questionnaire was again studiedby the FGD members. Based on the feedback and further suggestions from the FGD members the final draft of the questionnaire was approved to be tested.

To check the reliability of the questionnaire, an initial study was conducted with known individual investors with an option of feedback on the questionnaire. Based on the feedback, the questionnaire was framed for the pilot study. The questionnaire consists of four sections.

Section (A) Socio-demographics of the respondent

Section (B) Risk tolerance assessment

Section (C) Behaviour bias assessment

Section (D) Investment decision choice.

The target population for this study are the individualretail investors in Chennai taken randomly representing all strata of society. Some attention was taken to ensure the sample population represents all strata of the society equally to get a proper understanding for comparisons to be done based on gender, income etc.

3.6 Methods of Analysis

A lot of statistical techniques was used for analysing the data collected through the questionnaire and statistical software like SPSS 21.0 was used for analysing the data.

The following table presents the method of analysis used to achieve the research objectives

Table 3.1 Methods of Analysis

S. No.	Research Objectives	Methods of Analysis
1.	Risk tolerance assessment	Descriptive statistics
2.	Behaviour bias assessment	Descriptive Statistics
3.	Effect of risk toleranceon behavioural biases	Regression analysis
4.	Iinfluence of demographicvariables on risk tolerance	Multiple regression analysis
5	Relationship between risk and behaviour bias	Correlation analysis
6.	Identifying the underlying factors	Exploratory factor analysis

3.7 Research Design Elements.

A research design is an outline of the whole procedure for ascertain the research problems, describing the constraints for the study and conditions for collection and analysis of data.. Also, it makes sure the usefulness in addressing the research problem.Table 3.2 presents the elements of the research design adopted in the current study.

Table 3.2 Research Design elements

S. No	Elements	Nature of Elements
1.	Research Purpose	Exploratory, Descriptive and Explanatory
2.	Research Philosophies	Positivism
3.	Research Approach	Deductive
4.	Research Strategies	Interview and Survey
5.	Research Choices	Qualitative and Quantitative
6.	Time Horizon	Cross-sectional
7.	Procedures	Structured Questionnaire

The present study proposes to use a mixed-method approach to achieve the stated objectives. It is suggested that the mixed approach is appropriate when researchers know little about the subject and as such it should be examined as to what variable need to be used using qualitative research**(Creswell *et al.*, 2003).** Therefore, a qualitative study was conducted to identify the biases and risk attitude to develop the questionnaire and thereafter the survey method was adopted to study the various factors that influence investment decisions.

Overall, the present study is Exploratory, Descriptive and Explanatory. It is exploratory as the relevant literature was reviewed, and industry experts were interviewed. It is descriptive as the socio-demographic impact on the investors is studied. It is explanatory as the effect of each variable on another variable is studied. The present study is designed under the positivist research paradigm to accomplish the stated objectives. Quantitative data were collected through a structured questionnaire using survey research. The data obtained were statistically analysed and research findings were used to describe the risk profile and

behavioural biases of individual investors.

The present study used the deductive approach because the research objectives were developed based on a conceptual and theoretical understanding of behavioural theories relevant to individual investor's decision making

3.7.1ResearchPurpose

The purpose of any research lies in the manner in which the research questions and objectives are approached.**Saunders *et al.* (2009)**explains that the research purpose can be classified into three categories, exploratory, descriptive and explanatory. There is a possibility in any research that there may be more than one purpose. In such a scenario, the study can be both explanatory and descriptive.

3.7.2 Research Philosophy and Research Paradigm

Based on the reviewed research philosophies and the paradigms in the research domain, the present research is modelled based on the***positivistresearch paradigm*** to achieve thedefined objectives. The survey research method was used to collect the data. The data obtained were statistically analysed and research findings were used to describe the risk profile and behavioural biases of individual investors.

3.7.3 Research Approach

Creswell (2013), "Research approaches are plans and procedures that extends the actions from broad assumptions to detailed method of data collection, analysis and interpretation"

The research approach can be classified based on the nature of research questions and data collection method. Hence, they can be classified into two types,

a) Deductive approach and

b) Inductive approach.

The present study used the ***deductive approach*** because the research objectives were established based on the theoretical understanding of risk aversion and bias theories related to investment decision making. It further, studies theimpact of socio-demographic factors on investment decisions and the relationship between risk profile and behavioural biases.

3.7.4ResearchStrategies

Research strategy enables the researcher to conduct the research systematically. Research methods tell the researcher how to collect and analyse data, e.g. through interviews, questionnaires, or statistical methods. The main research strategies are, experiment, survey, case study, action research, grounded theory, ethnography and archival research.

The present study used asurvey strategyto answer the stated researchobjectives. The survey approach is used in the present study because of its ability to facilitate the approach of a large number of individuals dispersed geographically in a less expensive and time-saving manner.

3.7.5 ResearchChoices

The present study used a ***mixed-method approach*** for data collection and analysis. The preliminary study was a qualitative study that recognized the probablefactorsthat influence investment decisions. In the preliminary study, a focus group discussion was conducted and a quantitative approach was followed for the main study. These factors identified in the preliminary study were used in the main study for the development of the research instrument and to explain the

researchfindings using statistical tools and techniques.

3.7.6 Research process for the Present Study

The current study consists of three parts as per the design proposed,

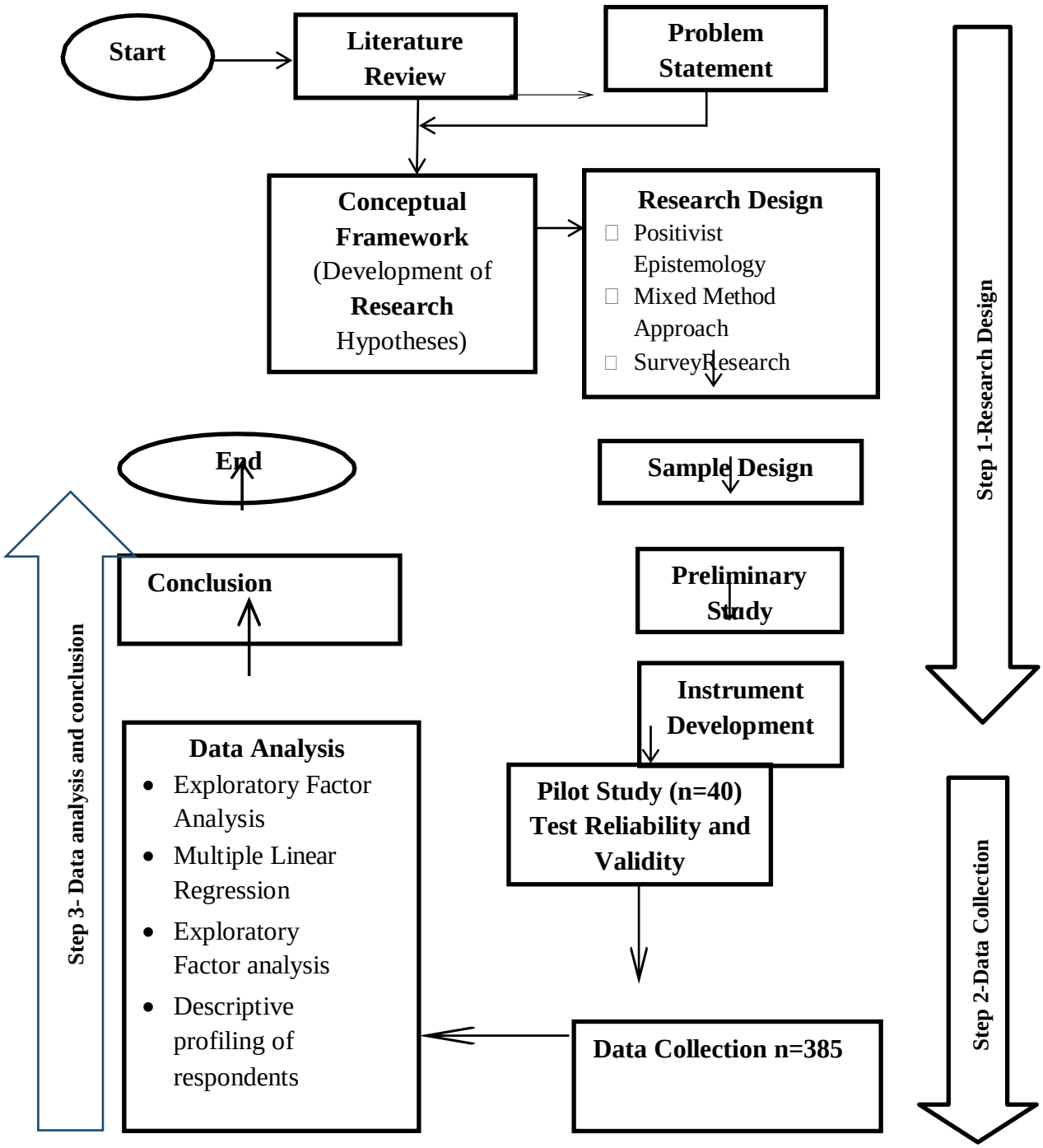
The first part is the research design:

Based on the literature review, research gaps were identified and a conceptual model wasdesigned.. The research instrument was designed based on discussions with investment experts to get the maximum information without making the respondents uncomfortable. A Pilot study was conducted to check the questionnaire and ease of the respondents.

The second partconsists of the data collection part. The pilot study was done with 40 respondents. The main objective of the study was to test the reliability of the items and to find out if the respondents felt at ease in responding to the questionnaire. This was followed by data collection from the respondents.

The third part consists of screening the data and analysis of the data as per the methodology adopted in the current study. Inferences were drawn from the analysed data and the study concludes with the findings, limitations and further scope.

Fig 3.4 Research stages



3.8Scope of Research (Target Population, Sample frame, Accessible population)

Bryman and Bell (2007) definea population as "*the universe of units from which the sample is to be selected*". As such, the research population is considered to be a well-defined collection of individuals or objects with similar characteristics.

Target Population denotes well-defined group of individuals or objects for which the conclusions can be generalised. It is the population with targeted specifications such as a group of individuals like investors, or companies, hospitals, college students, cities, countries that share similar characteristics. **Zikmund**(2003)and **Baker**(1994).

The target population for this study represents the working population whoo invest in Chennai. Chennai is one of the established cities in India where major Indian and MNC companies both in the services as well as manufacturing sectors have set up base. In the last decade, there has been a constant migration from other states due to the various employment opportunities available and affordable living atmosphere. Unlike other studies done which target the specific type of investors like equity investors or fixed-income investors, this study is generalised and covers all major types of retail investments like mutual funds, insurance, fixed deposits etc. The estimated population (inclusive of the migrants from other states) of Chennai in 2020 is approximately 11 million as per world population review **(https://worldpopulationreview.com/world-cities/chennai-population).**

Accessible Population is that population where the researchers can *apply* their conclusions. The accessible population is a subset of the target population from where the researcher draws samples to conduct their study. In other words,

theaccessible population is the sample frame with the needed characteristics which represents the general population **Asiamah et al (2017).**

Sample Frame

A sampling frame is the list of all the elements in the population from which the sample is drawn (Zikmund, 2003; Sekaran, 2000). The sampling frame is got from the contact information of investors provided by a few Insurance and mutual fund agencies in Chennai. A few seminars and road shows were conducted to interview respondents at random. The agencies provided a list of all active investors between 2015 and 2020 in Chennai. Thus, in this study, the sampling frame was prepared based on the availability of contact information and investment activity of the investor.

3.9SampleSize

Taking the national estimate of the work force as per census data 2011 as 40%, the target population is estimated at 4 million individuals who are in the work force. Since it is impractical to use the whole target population for this study, a selected sampling size is taken as recommended by other researchers using the Cochran formula to derive at the population size **Cochran, W.G.** (1963).

To establish the representiveness and generalization of the sample, sampling design and size are the two key elements (Sekaran, 2003).

According to Collis and Hussey (2009), “the larger the sample the better it will represent the population”.

Three criteria need to be specified to arrive at the sample size,Glenn D Israel (2017)

a. **Level of precision** (sampling error)- is the range in which the true population value is estimated to be

b. **Level of confidence** – encompassed from the Central limit theorem is that when a population is repeatedly sampled, the average value got from the samples is more or less equal to the population

c. **Degree of variability** refers to the distribution of attributes in the sample. A large sample is required for a heterogeneous population to obtain a given level of precision and smaller size of the sample is enough for a homogenous population

The widely accepted Cochran formula to determine the sample size is used in the current study.

- The confidence level for this survey is taken to 95%
- The Margin error is taken to be 5%
- The degree of variability (i.e. p) being the (estimated) proportion of the population that has the desired attribute in question has been taken as 50%

$$n_o = \frac{Z^2 pq}{e^2}$$

Applying Cochran formula,

Z score =1.96 from the table

p =.5

q = (1-p) =.5

e =.05

Sample size = $\frac{(1.96)\ ^2*(.5)\ (.5)}{(.05)^2}$ = **385**

3.10Sampling method:

This study used purposive sampling in the initial stagesin selecting the participants for the focus group interview because purposive sampling assists in identifying and selecting experts and professionals in the interested domain **Creswell and Plano Clark**, (2011). For the main study random sampling was done to collect data for the study. Hence in the current study both probabilistic and non-probabilistic techniques were used.

3.11 Research Instrument Development

A questionnaire is an organized framework to gather preliminary data to be used in the study (Hair et al 2010).

3.11.1 Questionnaire design and testing

The questionnaire consists of questions that are factual and subjective. The factual questions help to classifyinvestors based on their demographic factors and the subjective questions help to capture the respondent's attitude and behaviour.

Agarwalla et al (2012) reported that investors in India tend to rely on investment advisers to decide on their investments. Therefore to design and develop the questionnaire to be used in the study, experienced advisers in the mutual fund industry, insurance agents, fixed Income agents, and real estate brokers were approached for a face to face interview.Professionals and experts in the investment field can give insights into the behaviour of investors which can be used to develop the questionnaire for the survey. The main purpose of the Focus Group Discussion (FGD) was to identify the items for the questionnaire based on ease, simplicity and relevance.

Unlike quantitative research where the sample needs to be representative of the population, qualitative research tends to be small in size to establish a rapport with the respondents to get quality information **Crouch and McKenzie**, (2006). Research has shown that data saturation usually occurs once 10-18 participants have been interviewed **Korb**,(2010).).

As such, in the discussions with the experts, new perspectives regarding the subject matter stopped emerging after about 10-12 interviews and after 15 interviews there emerged a framework to formulate the questionnaire.

The questionnaire used in the current study was developed keeping in mind the research objectives to determine the variables. This was done using the information got from the experts, feedback from the preliminary respondents and also from the past surveys done by previous researches on risk profiling and behaviour bias. As such three constructs, risk profile, behaviour bias and Investor behaviours were identified for the study. The questionnaire items were based on items that are widely used by practitioners both in India and abroad. **Grable and Lytton (1999**), **Barsky et al Survey of Consumer finances, Dospert scale, Finametrica.** References were taken from the past studies done on behavioural biases and modifications were done to adapt to the Indian context.

Issues discussed in the FGD (See Appendix B)

a) Socio demographic factors that will be apt to use in the study

b) Risk profiling questions which will be relevant to the study

c) Bias statements which can be related to the investment decision

From the perspectives and views gathered from the experts, the questionnaire was designed and was tested with 10 randomly chosen individuals with provision for giving feedback on the ease of answering the questionnaire.

The first questionnaire was tested with 10 respondents and the feedback got. The respondents felt that certain questions and statements were ambiguous and irrelevant. For example, certain questions and statements were related to investing in the share market to which many of the respondents were not aware of. Hence, it was decided to make the questions generalized without naming any investment type.

The modified questionnaire was tested the second time with 10 different respondents. Though the feedback from the respondents was good, the reliability score (Cronbach Alpha) was around .60 which was below the acceptable limit of .70. The items were reworked again and it was decided to test the new questionnaire with more respondents.

The third study with the modified questionnaire done with 20 individuals was very satisfiable and acceptable with positive feedback and an acceptable reliability score. Hence it was decided to go ahead with the pilot study with 40 respondents to get a clearer picture of the research under study. The rationale for fixing the pilot study at 40 respondents was got by using the formula suggested by **Viechtbauera et.al**(2015).

The final Questionnaire was framed with five sections (See Appendix A)

1. Demographics

   Age, Gender, Income, Occupation

2. General Risk Profile -10 items

3. Investment Risk –5items

4. Cognitive Bias – 10 statements of 2 bias each

   Anchoring, Overconfidence, Confirmation, Availability, Mental Accounting

5. Emotional Bias – 10 statements of 2 bias each

   Loss Aversion, Herd mentality, Endowment, Self-control, Familiarity

3.11.2 Question types

Questions can be classified into, open-ended questions, closed-ended questions, **Dillman** (2000).

Open-ended questions are generally used in qualitative research and because this study is a quantitative study, closed- ended questions were framed. Also, in closed ended type we chose the ordered choices to frame the question which makes the respondents to choose from a given set of choice.

Scale of measurement

Questions are divided into different types based on the scale of measurement,

- Category questions - to identify the respondent's characteristics
- Dichotomous questions – yes and no answer, true false
- Multiple choice questions- choosing more than one option
- Ranking questions- ranking helps to study the relative importance
- Likert scale type – used to measure attitude or opinion normally on a 3, 5, 7 point rating

The questions used in this study are category questions, Likert scale questions and ranking questions

3.11.3 Layout and Content of the Questionnaire

The questionnaire for this study was constructed in English and the questionnaire included a short brief stating the objective of the survey. The respondents were given an option to disclose their name and contact details as per their willingness.The questionnaire consists of four sections:

Section A looks into the respondents' socio-demographic characteristics. It consists of category questions corresponding to the respondents' socio-demographic characteristics,

The parameters for socio-demographic factors were:

Gender - (male, female),

Age groups - (<30, 31-40, 41-50, 50-60,>60),

Occupation - (salaried, Business/self-employed, Retired),

Income - (<3 lakhs, 3-5lakhs, 6-10 lakhs, 10-20 lakhs, >20 lakhs)

Section B focuses on 10 situations to assess the risk appetite of the respondent. The tolerance level was assessed using a five-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Based on the scores the respondents can be classified if they are risk-averse or risk-seeking

Section C aims to capture the Investor behaviourthrough five hypothetical investment situations. Five choices were given per item and the respondent had to choose one choice. Based on the investment choices made, the Investor

behaviourcan be deduced.

The final section D of the questionnaire consists of 20 statements to capture the dominant behaviour bias of the respondent. The 20 statements consist of prominent 10 biases with 2 questions for each bias. For the given statements, the respondents has to rate them on 5 point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Based on the scores the respondents can be classified if they are biased or unbiased.

3.12 Data Collection -

Saunders *et al.*(2009) advocated that the selection of data collection method should be based on the research objectives of the study.**Dillman** (2000) recommended that a well-made questionnaire complementedalong with a suitable data collection method is very vital. Defining a good system of data collection is an integral part of research design. Sekaran (2000).

The survey method adopted is an interviewer-administered method. Telephone questionnaires and structured interview method are widely used in the survey method. It was decided not to use the self-administered method as the respondent may not be in a position to exactly understand and answer the questions. The telephonic interview method was also not followed as it was felt that the needed comfort level would be missing (**Saunders *et al.*,**2009).

Primary data was collected from the respondents during the pilot study and the main study. The respondents were personally met by the researcher and sometimes used the help of friends and relatives to conduct the interview. Investor databases from known financial advisors were the primary source to identify respondents for the

study.Alternatively, respondents representing the salaries class were contacted with the help of HR personnel from a few leading companies in Chennai.

A lot of literature was reviewed for the study. The objectives of the current study were formulated by reviewing the past studies and research works done. Hence in the current study, both primary and secondary data were used.

3.13Scoring of responses for the questionnaire:

The study aims to find the influence of the socio demographic factors on the independent variables, Risk and Bias. Sinceit is not possible to do regression analysis between Demographic variable (which is nominal) on the variables (which is measured on a 5 point scale), dummy coding is done for the demographic variables for analysis purpose **Suits, D. (1957).**

Behaviour bias is determined by 20 questions consisting of 10 Cognitive bias questions and 10 Emotional bias questions. Respondents are asked to score on the Likert scale from 1 to 5 with 5 being associated with bias and 1 being not associated with bias resulting from a range of scores from 10 to 50. A score of less than 20 is taken as no bias and a score of above 30 is taken as positive for the bias. Score of 20-30 is taken as bias neutral. This is done for both cognitive biases as well as for emotional biases.The score is again coded back for data analysis.

Table3.3Classifications of BIAS

Score	Code	Remarks
0-10	1	Bias negative
11-20	2	Somewhat bias negative
21-30	3	Bias neutral
31-40	4	Somewhat bias Positive
41-50	5	Bias positive

Risk-taking ability is determined by 10 questions, five on general risk- taking ability and five specific to investment and gambling on a 5 point scale. 5 being Risk seeking and 1 Risk-averse. A score above 30 is taken as risk-seeker and a score below 20 is taken as risk avoider. Scores of 20-30 are taken as risk neutral. The score is again coded back for data analysis to be used by SPSS software

Table3.4 Classifications of RISK

Score	Code	Remarks
0-10	1	Risk Averse
11-20	2	Somewhat Risk averse
21-30	3	Risk neutral
31-40	4	Somewhat Risk seeker
41-50	5	Risk seeker

Investment behaviour score is got from a list of 5 hypothetical investment questions to determine the Investor behaviour. Each question has 5 options and a score of 5 is given to the risky choice and a score of 1 is given tothe least risky choice. The score is summed up and coded again for analysis purpose. Table 3.3 below, explains how the Investor behaviour is identified based on the investment decision scores of the respondent.

Table3.5Classifications of INVESTOR BEHAVIOUR

Score	Code	Investor behaviour
0-5	1	Conservative investor
6-10	2	somewhat conservative investor
11-15	3	neutral Investor
16-20	4	somewhat aggressive investor
21-25	5	aggressive investor

3.14 Relationship between risk and actual investment behaviour

The study aims to find the relationship between the risk profile of the investor with the actual investment behaviour. Actual investment behaviour is got from the investor's choice to invest in any asset class. The asset class is classified and coded as follows:

Table 3.6 Classification of ACTUAL INVESTOR BEHAVIOUR

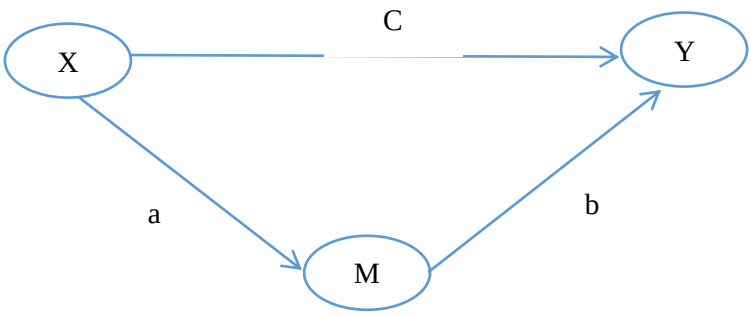
Asset class	**Classification**	**Code**
FD/PF	Risk averse	1
Gold	Somewhat Risk Averse	2
Real estate	Risk Neutral	3
Insurance policies/ULIPS	Somewhat Risk Seeker	4
Equity Shares/ equity mutual funds	Risk Seeker	5

3.15 Hypothesising the mediation model for the study

In a causal relationship between variables, there is a cause and effect relationship between the independent variable and the dependent variable. In a mediating hypothesis, another independent variable mediates or intervenes between the independent and dependent variable. Mediation in other words is the transmission of the independent variable effect on the dependent variable through the mediating variable

Assuming the independent variable as X, the dependent variable as Y and the mediating variable as M, the mediating model will be

Fig 3.4 Mediating model



Source: Baron and Kenny 1986

3.16 Mediation analysing method (Baron and Kenny 1986)

Baron and Kenny laid the following steps for analysing a mediation model and this method is followed widely.

1. The Independent variable X should be correlated to the dependent variable Y significantly

2. The independent variable should be significantly related to the mediator variable

3. The mediator variable should be significantly related to the dependent variable

4. The independent variable should not be significantly related to the dependent variable when controlled by the mediating variable, as such should be 0.

If all the four conditions are satisfied then it is a total mediation and if the first three conditions are satisfied and the fourth is not satisfied it is a partial mediation i.e. when the path C is reduced to zero , there is a strong case of a single dominant mediator. If the residual factor of path C is not zero then there exists a strong case of multiple mediating factors in the model.

Mediation can either be total or partial. In complete mediation the entire effect of the independent variable on the dependent variable is transmitted through the mediator variable(s) and the hence there is no direct effect of the independent variable on the dependent variable.

In a partial mediation, there is a direct effect on the dependent variable and the indirect effect is passed on by the mediating variable(s). The indirect effect can be represented by C=c'+ab, where a b is the product of the coefficients of path A and path B and the c' is the coefficient of path C when the model is controlled by the mediating variable.

Finally, the indirect effect of the independent variable and dependent variable needs to be significant using the Sobel test, Sobel(1982). This test is an approximate significance test to check the indirect effect of the independent variable on the dependent variable via the mediator. Preacher, K. J., & Hayes, A. F. (2004)

Sobel test equation

z-value = $a*b/\text{SQRT}\ (b^2*s_a^2 + a^2*s_b^2)$

Where

a= beta of path a

S_a=standard error of path a

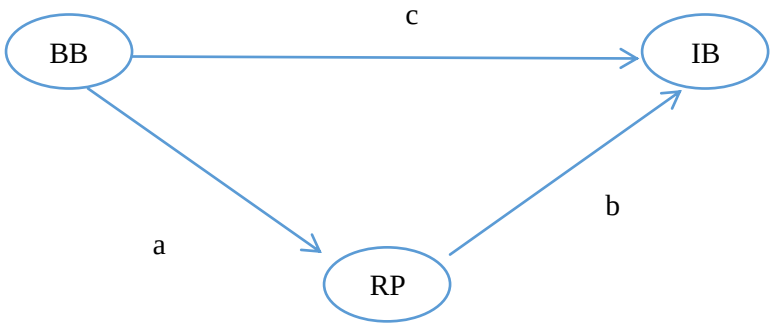
B=beta of path b

S_b=standard error of path b

3.17Mediating model for the current study

For the current study, behaviour bias is taken as the independent variable and the Investor behaviour is taken as the dependent variable. The risk tolerance score of the respondent is taken as the mediating variable having an effect on the bias and Investor behaviour. This study seeks to find out if risk tolerance is the single dominating factor or not. Psychological studies show the effect of numerous mediating variables in a cause and effect relationship. However for this current study only risk tolerance is taken as the mediating variable and other variables like age, gender, occupation, income isnot considered for this model

Fig 3.5 Mediating effect model for the current study



Note: BB=behaviour bias, IB =Investor behaviour, RP=risk profile, c= Total effect, a and b = indirect effect

Table3.7 Classifications of variables

Independent Variable	Bias
Mediating variable	Risk
Dependent variable	Investor behaviour

3.18 Methods of Analysis

The primary data collected was analysed with the help of the statistical software SPSS.

The research techniques adopted in the present study are asfollows-

Measures of frequency, central tendency, dispersion were used to analyse the various demographics, to assess the risk level and to identify the behavioural biases. Pearson test was done to establish the relationship between the variables risk, bias and investor decision. Principal component analysis and varimax rotation were done to identify the factors with most loadings.

Table3.8 Research techniques

Research Objectives	**Method of analysis**
To assess the Risk tolerance level among investors in Chennai	Descriptive analysis
To identify behavioural biases among investors in Chennai	Descriptive analysis
To analyse the effect of socio-demographic factors on behaviour bias among investors in Chennai	Multiple regression analysis
To analyse the influence of socio-demographic variables on risk profile of investors in Chennai	Multiple regression analysis
To establish the relationshipbetween risk Profile and behavioural biases of investors in Chennai	Pearson correlation test
To test the mediating effect of Risk	Multiple regression analysis, Sobel test
To establish the relationship and analyse the influence between risk Profile and the actual investor behaviour	Pearson correlation test and bi variate regression.

3.19Pilot Study

A pilot study was done before staring the main survey with 40 respondents. This pilot study was done to check the reliability, ease of answering and to check for ambiguity if any. Further the stated hypothesis and the proposed model to find the mediating variable was tested. The respondents were randomly distributed across age groups, gender, occupation, income levels. The questionnaire was personally administered to 40 respondents.

Results of the pilot study.

- The pilot study was done with 40 respondents and the reliability score was 0.719 using the Cronbach alpha test. This score is accepted as good.
- Social-demographic factors were regressed on risk and bias with an R^2 score of .23 and .35 respectively. An $R^2$of .20 is generally accepted for human behaviour studies.
- Risk as a mediating variable was established between bias and investment decisions

3.20Summary

The objective of this chapter is to present the research design and methodology to be implemented in the study. The analysis of the pilot study is also provided in brief. The pilot study with forty respondents was done to check if the study is in line with the research process. In the subsequent chapters the main study will be discussed.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

4.1 Overview

The main study was done after the pilot study taking into considerations the short comings in the pilot study. This section presents the findings of the main study in alignment with the objectives of the study.

Contents of the Section:

A. Descriptive study on the socio-demographics

B. Factor Analysis of risk and bias

C. Mediation analysis on the variables in the study

D. Relationship between risk and actual investment behaviour

4.2 Reliability Test

Reliability refers to the consistency of a measure. Psychologists consider three types of consistency: over time (test-retest reliability), across items (internal consistency), and across different researchers (inter-rater reliability). We have used Cronbach alpha to measure the reliability across items to measure the internal consistency of the items. Cronbach's alpha is a measure of internal consistency to know how closely related a set of items are as a group and as such, it is considered to be a measure of scale reliability. .

Table 4.1Cronbach alpha acceptable range

Cronbach Alpha coefficient range	Category
<.60	Poor
.60-.70	Average
.71-.80	Good
.81-90	Very good
>.90	Excellent

In this study to measure the test of reliability SPSS software was used to measure the alpha value

Table 4.2. Case processing summary

	N	%
Valid	385	100
Excluded	0	0
Total	385	100

Source: SPSS output

Reliability Statistics

Table 4.3. Reliability score

Cronbach's Alpha	N of Items
0.766	35

Source: SPSS output

The reliability score according to using the Cronbach alpha method is .766. According to the Cronbach alpha method, a score of above .70 is considered to be acceptable. Since the Cronbach alpha for the items in the questionnaire is .76, it is accepted that the items are consistent.

A. Descriptive study on the socio-demographics

4.3 Analysis of the socio-demographic factors in the study

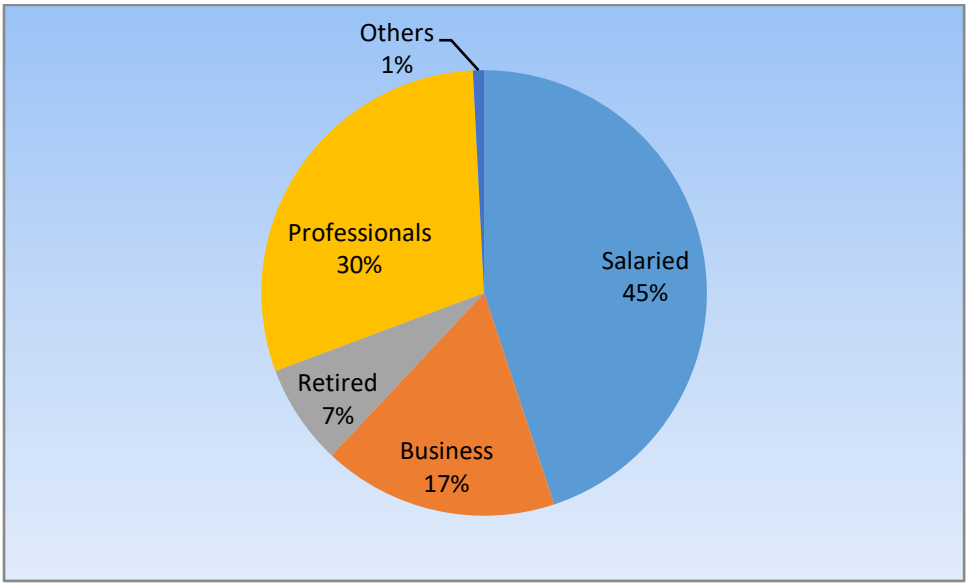
For any research study, it is imperative to understand the demographics of the sample size. Demographics like age, gender, income help in classifying the respondents and also help in drawing inferences in the final findings.The demographics factors like age, gender, occupation and income were collected for the sample size and analysed using SPS software.

Table 4.4. Occupation frequency table

Occupation	Frequency	Percent
Salaried	173	44.9%
Business	66	17.1%
Retired	28	7.3%
Professionals	115	29.9%
Others	3	0.8%
Total	385	

Source: SPSS output

Fig 4.1: Occupation pie chart



Source: SPSS output

To identify the occupation of the respondents, they were categorised into five classes. In the current study salaried class constituted the major share with 45% followed by professionals like doctors, auditors, advocates with 30% while the business class were 17%. The study also consisted of 7.8% of retired people and housewives.

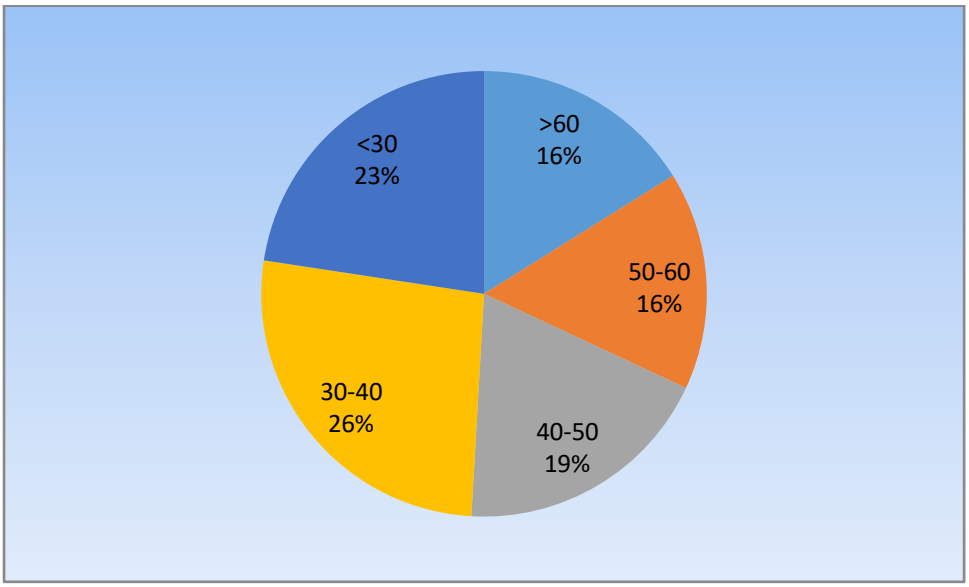
Though the study aimed to cover the occupation of the respondents equally, a lot of salaried and professionals were approached because of the ease of contacting to get the questionnaires filled.

Table 4.5 Age-frequency table

Age	Frequency	Percent
>60	62	16.1%
50-60	61	15.8%
40-50	73	19%
30-40	102	26.5%
<30	87	22.6%
Total	385	

Source: SPSS output

Fig 4.2: Age pie chart



Source: SPSS output

For the current study, it was decided that all the age categories should be equally distributed to analyse the risk and bias according to their age group. In the current

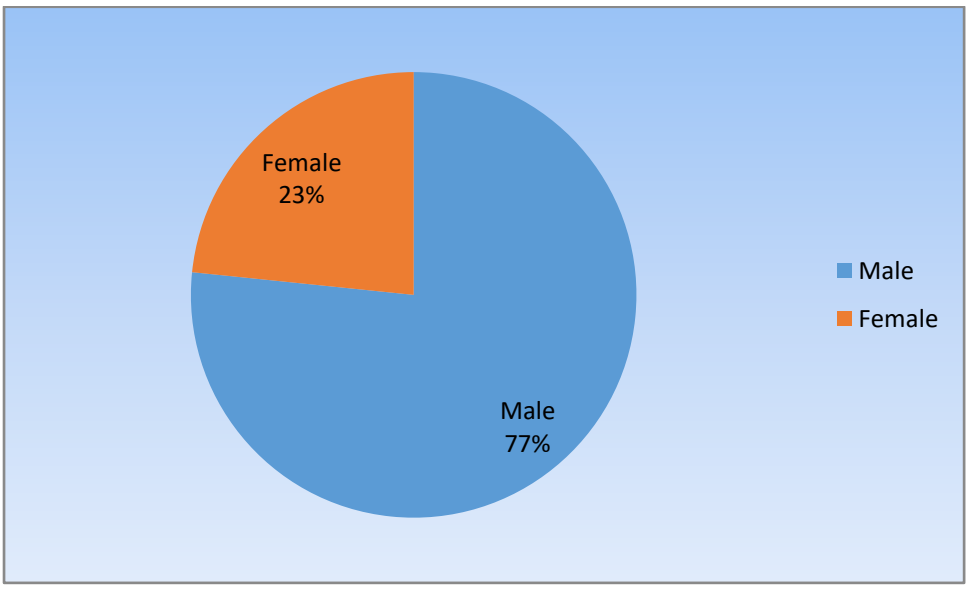
study, the 30-40 gage group was interviewed the most with 26% followed by the below 30 age group at 22%. The remaining three age groups 40-50, 50-60 and the greater than 60 age group were more or less equally distributed at 19%, 16%, and 16% respectively.

Table 4.6 Gender frequency table

Gender	Frequency	Percent
Male	295	76.6%
Female	90	23.4%
Total	385	

Source:SPSS output

Fig 4.3. Genderpie chart



Source: SPSS output

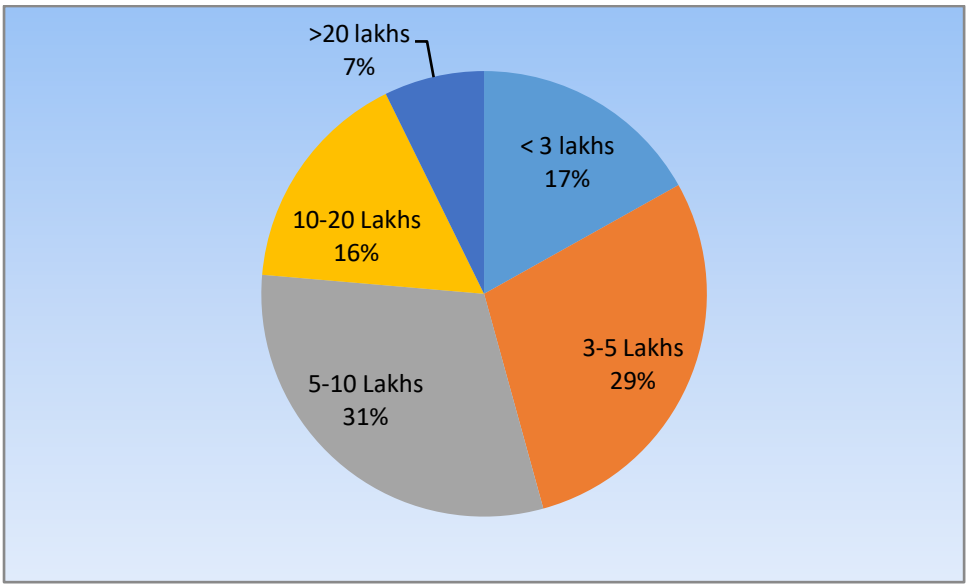
In the current study out of the total respondents of 385, 295 (77%) were men and 90 (23%) were women.

Table 4.7 Income frequency table

Income	Frequency	Percent
< 3 lakhs	65	16.9%
3-5 Lakhs	111	28.8%
5-10 Lakhs	118	30.6%
10-20 Lakhs	63	16.4%
>20 lakhs	28	7.3%
Total	385	

Source:SPSS output

Fig: 4.4 Income pie chart



Source: SPSS output

From the income frequency table, we can infer that the maximum number of respondents fall in the 5-10 lakhs category at 30.6% followed by the 3-5 lakhs at 28.5%. Hence in the current study, 60% of the respondents fall into the 3 lakhs to 10 lakh category while the less than 3lakhs and 10 -20 lakhs are equally distributed

at 16% each and the creamy layer of >20 lakhs at 7.3%. Hence, it can be assumed that on the income category the study more or less reflects the working population.

4.4 Preferences of the respondents

This section aims to analyse the preferences of the respondents in choosing their investment goals, preferred investments and their preferred source ofinvestment advice.

4.4.1 Investment Knowledge

To start with the respondents were asked to state their level of knowledge with regards to investments. The responses were collected and accordingly classified as per table 4.8

Table 4.8: Investor behaviour table

Investor behaviour	Frequency	Percentage
Moderate	154	40%
Beginner	97	25%
Knowledgeable	77	20%
Experienced	57	15%

Source: SPSS output

Out of the 385 respondents, 40% responded that they have moderate knowledge of investments, 25% felt that they are beginners in investment, 20% claimed to be knowledgeable and 15% felt that they are experienced investors. So it can be concluded that only 25% of the respondents are new to investments and the remaining 75% of the respondents have moderate to good knowledge of investing.

4.4.2 Investment goals of investors

In the current study, a list of standard investment goals was prepared with the help of industry experts. The respondents were asked to rank them according to their preference with 1 being most preferred and 6 being the least. Table 4.9 summarises the frequencies and table 4.10 shows the weighted total and ranking according to the weighted total.

First, the weighted total is calculated by giving the preferred goal the most weightage of 6 and the least preferred the least weightage of 1.Thus, the Children future goal score is calculated as (193*6)+(81*5)+43*4)+(23*3)+(24*2)+(21*1). To get the ranks the weighted totals were sorted from highest to least and the highest weighted total given the top rank.

Table 4.9 Investment goal frequencies of investors

Investment Goals	**Rank**					
	1	2	3	4	5	6
Children's future(Education/marriage)	193	81	43	23	24	21
Retirement	102	102	81	44	31	25
Purchase of Assets(house/car)	54	55	74	66	83	53
Vacation Abroad	8	22	43	154	134	24
Emergencies	9	34	57	89	103	93
Charities	19	91	87	9	10	169

Source: SPSS output

Table 4.10 Weighted total and ranking of investment goals

Investment goals	Weighted total	Ranking
Children's future(Education/marriage)	1873	1
Retirement	1665	2
Purchase of Assets(house/car)	1312	3
Charities	1133	4
Vacation Abroad	1084	5
Emergencies	1018	6

Source: SPSS output

The goal for which the respondents are investing was identified and accordingly ranked based on the weightage allocated to each goal. Based on the data collected children's future concerning education and marriage was top-ranked with a score of 1873 followed by retirement allocation with a score of 1665 and purchase of assets like house and car (1312). Saving for emergencies and going on a vacation abroad was the least preferred among the investment goals. Hence, in the current study, we can state that for the respondent's children's future is the important criteria for investment followed by retirement planning. Also, in this study, we can state that the respondents treat investing for emergencies as their least priority whereas, in investment planning, emergency planning is considered as the first action to be taken.

4.4.3 Investment preferences of investors

In the current study, a list of the most popular investment avenues was prepared with the help of industry experts. The respondents were asked to rank them according to their preference with 1 being most preferred and 6 being the least. Table 4.11 summarises the frequencies and table 4.12 shows the weighted total and ranking according to the weighted total.

First, the weighted total is calculated by giving the preferred goal the most weightage of 6 and the least preferred the least weightage of 1.Thus, the fixed deposit score is calculated as (143*6)+(106*5)+(68*4)+(23*3)+(24*2)+(21*1). To get the ranks the weighted totals were sorted from highest to least and the highest weighted total was given the top rank.

Table 4.11 Frequency of investment preferences of investors

Investment preferences	**Rank**					
	1	2	3	4	5	6
Fixed Deposits	143	106	68	23	24	21
Gold	152	77	56	44	31	25
Provident Fund	8	22	43	154	134	24
Real estate	54	55	74	66	83	53
Equity Shares/ equity mutual funds	9	34	57	89	103	93
Insurance policies	19	91	87	9	10	169

Source: SPSS output

Table 4.12. Ranking of investment preferences

Investment preferences	**Weighted total**	**Ranking**
Fixed Deposits	1590	1
Gold	1568	2
Real estate	1086	3
Provident Fund	951	4
Insurance policies	868	5
Equity Shares/ equity mutual funds	843	6

Source: SPSS output

In the current study among the various available investment options available to the respondents, the most preferred option to them is both fixed deposits and gold. The

investors also look towards real estate but rank them below fixed deposits and gold. This could be because of the huge investments required for investing in real estate. Equity investment both direct and through mutual funds ranked was the least preferred option for investment options. Other investment options like insurance policies which were earlier very popular do not seem to be preferred by the investors.

4.4.4 Investment information sources of respondents

The study also aimed at finding the sources through which the investors get their investment advice to invest. In the current study, a list of most the popular investment advice sources were prepared with the help of industry experts. The respondents were asked to rank them according to their preference with 1 being most preferred and 6 being the least.

Table 4.13 summarises the frequencies and table 4.14 shows the weighted total and ranking according to the weighted total.

First, the weighted total is calculated by giving the preferred goal the most weightage of 6 and the least preferred the least weightage of 1.Thus, the fixed deposit score is calculated as (152*5) + (77*4) + (56*3) + (44*2) + (31*1) To get the ranks the weighted totals were sorted to highest to least and the highest weighted total was given the top rank.

Table 4.13 Frequencies of investment sources

Investment information source	**Frequencies**				
	1	2	3	4	5
Newspaper	152	77	56	44	31
TV news channels	54	55	74	66	83
Financial websites	8	22	43	154	134
Blogs/ social media	9	34	57	89	103
Friends & family	143	106	68	23	24
Financial advisors	19	91	87	9	10

Source: SPSS output

Table 4.14. Weighted total and ranking of investment information sources

Information source	Weighted total	Ranking
Friends & family	1798	1
Newspaper	1740	2
TV news channels	1312	3
Financial advisors	1133	4
Financial websites	1084	5
Blogs/ social media	1018	6

Source: SPSS output

Based on the data collected and the analysis done, friends and families of the investors are the main sources of advice for the respondents followed by information from the newspaper. Investors in this study also tend to look for advice on TV business channels and websites. The practice of seeking advice from professionals is yet to pick up in Chennai as is evident from the no.4 ranking. From this study, it is evident that the respondents tend to take advice from their friends, family members rather than seek advice from professional investment advisors.

4.4.5 Investment as a Percentage of Income

The current study aimed to find out what percentage of their income is the investors willing to invest in their future goals.Table 4. 15 below categorises the percentage of income the investors are willing to invest according to the income slabs.

Table 4.15 Investment as a percentage of income

Investment %	**Income**				
	<3 lakhs	3-5 lakhs	5-10 lakhs	10-20 Lakhs	>20 lakhs
<20%	100%	63%	25%	9%	0%
20-40%	0%	37%	64%	53%	42%
40-60%	0%	0%	11%	38%	52%
60-80%	0%	0%	0%	0%	6%
80-100%	0%	0%	0%	0%	0%

Source: SPSS output

From the data collected and analysed, it can be inferred that the respondents do not allocate more than 60% of their income into investments. Allocating 40-60% of their income is absent in the < 3Lkhs and 3-5 lakh slabs while 90% from the 10-20lakhs and >20 lakhs invest 40-60% of their income. Hence in this study, we can infer that the respondents on average allocate less than 20% to investments. As with the norms, in this study investment as a percentage of income is directly linked to the proportion of income earned. The less the income the lesser the investment allocation and then as income increases the allocation to investment also increases.

4.5 Demographics and Risk classification

Table 4.16 Risk statistics

N	Valid	385
	Missing	0
Mean		3.1221
Std. Deviation		0.83738

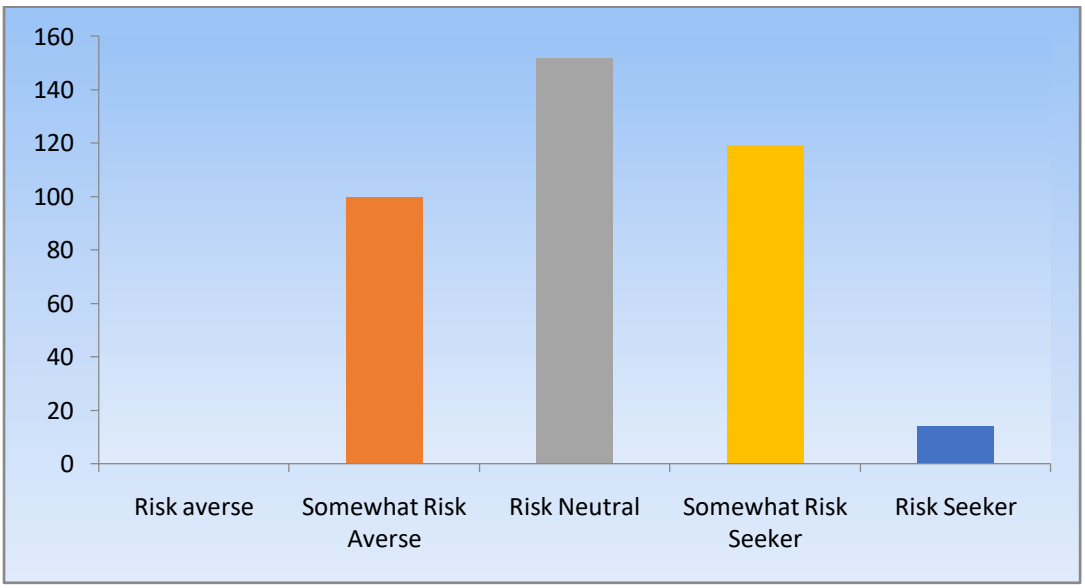
Source: SPSSoutput

Table 4.17 Risk classification

	Frequency	Percent
Risk averse	0	0
Somewhat Risk Averse	100	26
Risk Neutral	152	39.5
Somewhat Risk Seeker	119	30.9
Risk Seeker	14	3.6
Total	385	100

Source: SPSS output

Fig: 4.5 Risk frequency histogram



Source: SPSS output

In the current study as per the risk score statistics, a mean of 3.122 and a standard deviation of .8 are observed and hence the population in the study have an average of 3.12 risk score which falls in the risk-neutral category. Also since the standard deviation of .8 is less, the spread of the scores is less indicating that they are closer to the mean.

A majority of 39.5%is risk-neutral among the respondents followed by somewhat risk seeker at 30.9% and somewhat risk-averse at 26%. There are very few scores in the extremities with risk seekers being 3.6% and risk-averse 0%.

4.5.1 Gender and Risk

Table 4.18 Risk and gender cross tabulation in percentage

Gender	Somewhat Risk Averse	Risk Neutral	Somewhat Risk Seeker	Risk Seeker
Male	26%	41%	29%	4%
Female	27%	36%	36%	2%
Total	26.0%	39.5%	30.9%	3.6%

Source: SPSS output

In the current study out of the 385 respondents, 295 were men and the remaining 90 were women.39.5% of the total respondents were risk-neutral and 30.9% were somewhat risk seekers. Among the 295 men, 41% were risk-neutral and the remaining equally distributed among the somewhat risk seeking and being somewhat risk-averse. Among the 90 women, risk neutral and somewhat risk-seeker was equally distributed at 36% with 27% somewhat risk-averse.

4.5.2 Risk and age

Table 4.19 Risk and age cross tabulation

Age	Somewhat Risk Averse	Risk Neutral	Somewhat Risk Seeker	Risk Seeker
>60	58.06%	33.87%	8.06%	0.00%
50-60	42.62%	39.34%	18.03%	0.00%
40-50	28.77%	49.32%	20.55%	1.37%
30-40	15.69%	15.69%	15.69%	15.69%
<30	1.15%	36.78%	55.17%	6.90%
Total	25.97%	39.48%	30.91%	3.64%

Source: SPSS output

The risk scores were analysed with the age of the respondents according to the assigned age slabs. From the table above it can be inferred that the >60 slab tend to be risk-averse and risk-neutral while respondents in the <30 age bracket tend to be more risk seeking. As with earlier studies, as the age increases the propensity to take risk decreases thus having an inverse relationship.

4.5.3 Occupation and Risk

Table 4.20 Risk and occupation cross tabulation

Occupation	Somewhat Risk Averse	Risk Neutral	Somewhat Risk Seeker	Risk Seeker
Salaried	19.08%	34.68%	41.62%	4.62%
Business	27.27%	43.94%	21.21%	7.58%
Retired	53.57%	39.29%	7.14%	0.00%
Professionals	28.70%	43.48%	26.96%	0.87%
Others	33.33%	66.67%	0.00%	0.00%
Total	25.97%	39.48%	30.91%	3.64%

Source: SPSS output

Analysis of the data with regards to the occupation of the respondents and their risk score was done. In the current study, 39.48% of the respondents have risk-neutral scores with business class being the most followed by the professionals. Salaried people tended to be more in the somewhat risk seeking category than the professionals but when it came to somewhat risk-averse, 53.57% were retired people. Business and the salaried class tend be more risk taking than the others.

4.5.4 Income and Risk

Table 4.21 Risk and income cross tabulation

Income	Somewhat Risk Averse	Risk Neutral	Somewhat Risk Seeker	Risk Seeker
<3 lakhs	4.62%	32.31%	56.92%	6.15%
3-5 lakhs	21.62%	43.24%	29.73%	5.41%
5-10 lakhs	28.81%	42.37%	26.27%	2.54%
10-20Lakhs	44.44%	38.10%	15.87%	1.59%
>20 lakhs	39.29%	32.14%	28.57%	0.00%
Total	25.97%	39.48%	30.91%	3.64%

Source: SPSS output

The risk score and the income was analysed to find out which category in the income slabs are risk averse or risk seeking. A majority of the respondents are in the 3-5 lakhs and 5-10 lakhs. In this, 39.48% had risk-neutral scores while the balance was more or less equally distributed between somewhat risk averse and somewhat risk seeking. The creamy category of >20 lakhs was more or less equally distributed among the different classes of risk except risk seeking.

Hypothesis A

Socio-Demographic factors like Age, Gender, Income, Occupation does not influence the risk taking ability of the Investor

Age

H_0 : Age does not influence the risk profile of the investor

H_1 : Age influences the risk tolerance of the investor

Gender

H_0 : Gender does not influence the risk profile of the investor

H_1 : Gender influences the risk profile of the investor

Income

H_0 : Income does not influence the risk profile of the investor

H_1 : Income influences the risk tolerance of the investor

Occupation

H_0 : Occupation does not influence the risk profile of the investor

H_1 : Occupation influences the risk tolerance of the investor

Table 4.22 Regression model of socio-demographic and risk

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
0.503	0.253	0.245	0.72764

Source: SPSS output

Table 4.23ANOVA output for risk with the socio-demographics

		ANOVA			
	Sum of Squares	df	Mean Square	F	Sig.
Regression	68.07	4	17.017	32.141	.000
Residual	201.193	380	0.529		
Total	269.262	384			

Source: SPSS output

Table 4.24Regression model of socio-demographic and risk

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.927	0.264		7.307	0
Occupation	0.280	0.03	0.488	10.522	0
Age	0.317	0.037	0.525	8.478	0
Gender	0.308	0.088	0.452	1.008	0.02
Income	0.350	0.043	0.605	0.817	0

Source: SPSS output

A regression analysis was done for the socio-demographic factors over the risk score to establish the relationship and validate the hypothesis. The ANOVA table shows a significant level of <.05 and hence this model can be accepted.

From the regression table above, all the variables have their significance level below .05, hence the null hypothesis for age, gender, occupation and income is rejected i.e. age, gender, occupation and income significantly influence the risk taking ability of the investor.

4.6 Demographics and Bias

Table 4.25 Bias statistics

N	Valid	385
	Missing	0
Mean		3.4935
Std. Deviation		0.78101

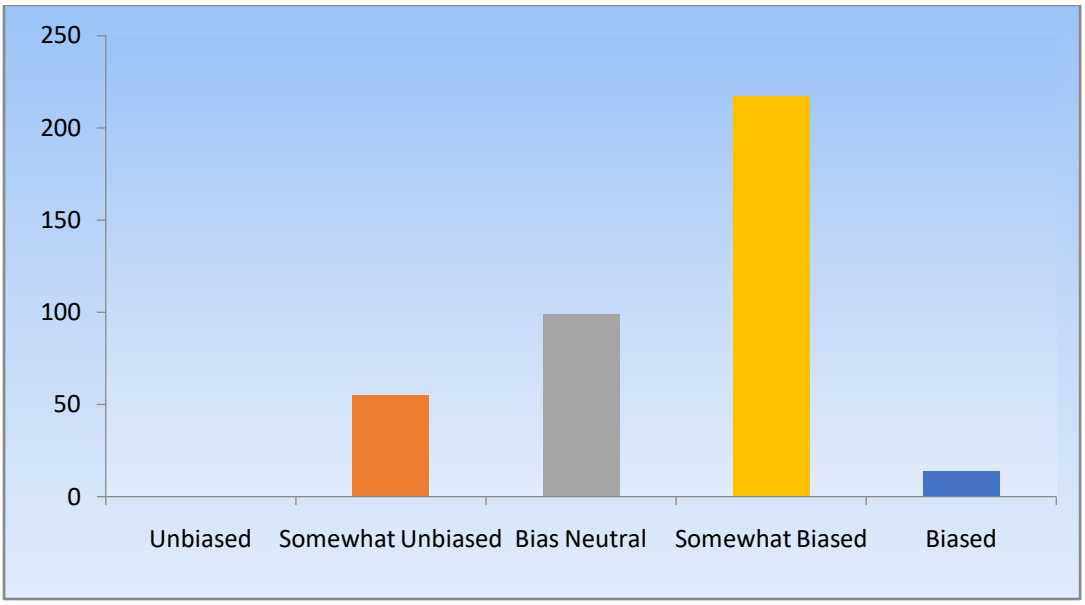
Source: SPSS output

Table 4.26 Bias frequency

	Frequency	Percent
Unbiased	0	0
Somewhat Unbiased	55	14.3
Bias Neutral	99	25.7
Somewhat Biased	217	56.4
Biased	14	3.6
Total	385	100

Source: SPSS output

Fig 4.6 Bias frequency histogram



Source: SPSS output

In the current study as per the bias score statistics, a mean of 3.4935 and a standard deviation of .78 is observed and hence the population in the study have an average of 3.5 bias score which falls in the bias neutral category. Also, since the standard deviation of .8 is less the spread of the scores is less indicating that they are closer to the mean.

In the current study, of the total respondents, 56% were somewhat biased followed by bias neutral at 25%. Only 3% were totally biased while there was 0% who showed total non-biasness. Only 15% were somewhat unbiased in their responses. This implies that out of the total sample population in the study, 60% of the respondents are biased in their investment decisions.

4.6.1Age and Bias

Table 4.27 Age and bias cross tab

Age	Somewhat Unbiased	Bias Neutral	Somewhat Biased	Biased
>60	2%	7%	6%	1%
50-60	2%	5%	6%	3%
40-50	0%	5%	14%	0%
30-40	1%	4%	22%	0%
<30	9%	6%	8%	0%
Total	14%	26%	56%	4%

Source: SPSS output

The bias scores were analysed with the age of the respondents according to the assigned age slabs. From the table above it can be inferred the respondents were equally distributed across the different age groups with the age group 30-40 having the most number of 22% in the biased category. From the data, it is observed that a majority 56% of the respondents belong to the somewhat bias category and in this 36%of respondents fall into the 30-50 age brackets.

4.6.2 Bias and gender

Table 4.28Bias and gender cross tab

Gender	Somewhat Unbiased	Bias Neutral	Somewhat Biased	Biased	Total
Male	37	81	168	9	295
Female	18	18	49	5	90
	55	99	217	14	385

Source: SPSS output

Table 4.29 Gender and bias in percentage

Gender	Somewhat Unbiased	Bias Neutral	Somewhat Biased	Biased
Male	13%	27%	57%	3%
Female	20%	20%	54%	6%

Source: SPSS output

From the table above it can be inferred that more than 50% of both males and females tend to be somewhat biased in their investment decisions. In the total biased and somewhat unbiased category, women tend to be more than men.

4.6.3 Income and Bias

Table 4.30 Income and bias cross tab

Income	Somewhat Unbiased	Bias Neutral	Somewhat Biased	Biased	Total
<3 lakhs	24	15	26	0	65
3-5 lakhs	12	28	71	0	111
5-10 lakhs	8	28	76	6	118
10-20Lakhs	8	20	31	4	63
>20 lakhs	3	8	13	4	28
	55	99	217	14	385

Source: SPSS output

Table 4.31 Income and bias in percentage

Income	Somewhat Unbiased	Bias Neutral	Somewhat Biased	Biased
<3 lakhs	37%	23%	40%	0%
3-5 lakhs	11%	25%	64%	0%
5-10 lakhs	7%	24%	64%	5%
10-20Lakhs	13%	32%	49%	6%
>20 lakhs	11%	29%	46%	14%
Total	14%	26%	56%	4%

Source: SPSS output

From the table above, 56% are somewhat biased followed by bias neutral at 26%. The 3-5 lakh category and the 5-10lakh category tend to exhibit this somewhat bias class is more than the other category and the remaining category are equal in this bias class. Of the totally biased class, the creamy layer of >20lakhs is the majority at 14% and in the somewhat biased class the < 3lakhs is the majority at 37%.

4.6.4 Occupation and Bias

Table 4.32 Occupation and Bias cross tab

Occupation	Somewhat Unbiased	Bias Neutral	Somewhat Biased	Biased	
Salaried	28	34	107	4	173
Business	13	24	27	2	66
Retired	2	13	11	2	28
Professionals	11	27	71	6	115
Others	1	1	1	0	3
	55	99	217	14	385

Source: SPSS output

Table 4.33 Occupation in percentage

Occupation	Somewhat Unbiased	Bias Neutral	Somewhat Biased	Biased
Salaried	16%	20%	62%	2%
Business	20%	36%	41%	3%
Retired	7%	46%	39%	7%
Professionals	10%	23%	62%	5%
Others	33%	33%	33%	0%
Total	14%	26%	56%	4%

Source: SPSS output

From the table above it can be seen that 60% of the respondents tend to be biased on the investment decisions followed by bias neutral at a distant 26% and somewhat unbiased at 14%. 4% tend to exhibit total biasedness in their investment decisions with the maximum being in the retired class. Salaried and professionals tend to be somewhat biased than the business and other class.

Hypothesis B

Socio-Demographic factors like Age, Gender, Income, Occupation does not influence the bias of the Investor

1. Age

H_0 : Age does not influence bias of the investor

H_1 : Age influences the bias of the investor

2. **Gender**

H_0 : Gender does not influence the bias of the investor

H_1 : Gender influences the bias of the investor

3. Income

H_0 : Income does not influence the bias of the investor

H_1 : Income influences the bias of the investor

4. Occupation

H_0 : Occupation does not influence the bias of the investor

H_1 : Occupation influences the bias of the investor

Table 4.34 Regression model of socio-demographic and bias

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.603	0.364	0.346	0.77021

Table 4.35Table of ANOVA for bias and socio demographic factors

		ANOVA			
	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.807	4	2.202	3.712	.006
Residual	225.427	380	0.593		
Total	234.234	384			

Table 4.36Regression model of bias and socio demo factors

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.284	0.279		11.764	0
Occupation	.301	0.032	.499	10.146	0
Age	.318	0.037	.526	8.494	0
Gender	.313	0.027	518	11.481	0
Income	.117	0.046	.172	2.554	0.011

Source: SPSS output

A regression analysis was done for the socio-demographic factors over the bias score to establish the relationship and validate the hypothesis. The ANOVA table shows a significant level of <.05 and hence this model can be accepted.

A regression analysis was done for the socio-demographic factors over the bias score to establish the relationship and validate the hypothesis. The ANOVA table shows a significant level of <.05 and hence this model can be accepted.

From the regression table above, all the variable have their significance level below .05, hence the null hypothesis for income, gender, occupation and age is rejected i.e. income, gender, occupation and age significantly influence the bias of the investor.

4.7 Demographics and Investor behaviour

Table 4.37Investor behaviour statistics

N	Valid	385
	Missing	0
Mean		3.4026
Std. Deviation		0.80784

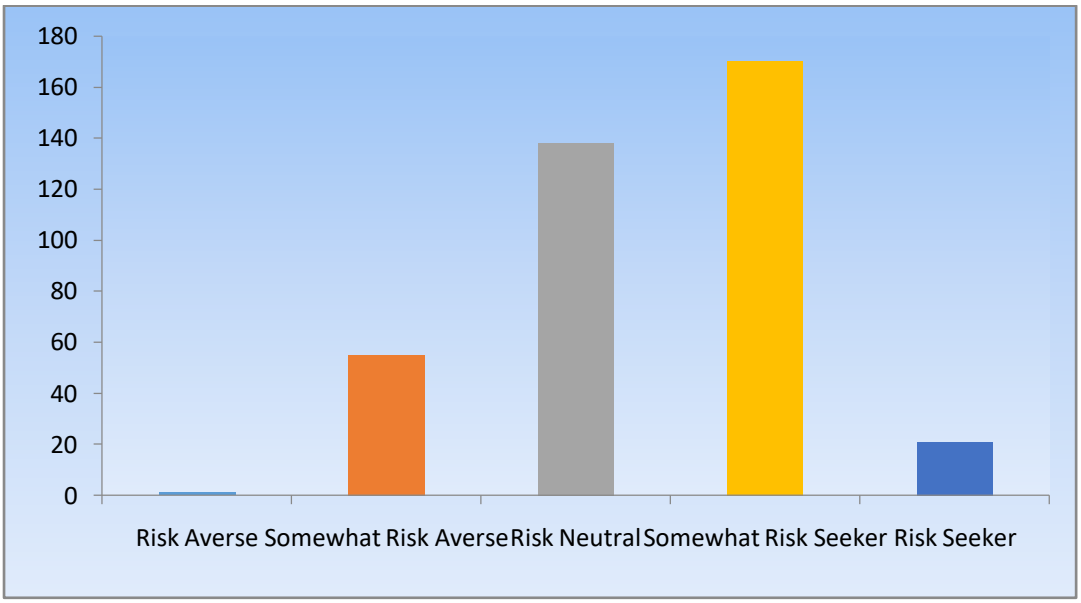
Source: SPSS output

Table 4.38Investor behaviour frequency

Investor behaviour	Frequency	Percent
Risk Averse	1	0.3
Somewhat Risk Averse	55	14.3
Risk Neutral	138	35.8
Somewhat Risk Seeker	170	44.2
Risk Seeker	21	5.5
Total	385	100

Source: SPSS output

Fig 4.7Investor behaviour histogram



Source: SPSS output

In the current study, the investor behaviour is determined by using the investment choices the respondent have made based on hypothetical investment scenarios. As per the investment choice score statistics, a mean of 3.40 and a standard deviation of .8 is observed and hence the population in the study have an average of 3.4 score which falls in the risk neutral category. Also, since the standard deviation of .8 is less the spread of the scores is less indicating that they are closer to the mean.

4.7.1 Relationship between risk, bias and Investor behaviour

Table 4.39Correlation between bias, risk and Investor behaviour

		Bias	Risk	Investor behaviour
Bias	Pearson Correlation	1	.136	.134
	Sig. (2-tailed)		0.007	0.008
	N	385	385	385
Risk	Pearson Correlation	.136	1	.447

	Sig. (2-tailed)	0.007		0.001
	N	385	385	385
Investor behaviour	Pearson Correlation	.134	.447	1
	Sig. (2-tailed)	0.008	0.001	
	N	385	385	385

Source: SPSS output

Pearson correlation coefficient test was done to study the relationship between the three variables, risk, bias and Investor behaviour. From the above table, the p-values for the correlation between bias and risk is .007, between bias and Investor behaviour is .008, and between risk and Investor behaviour is .001. Since all the values are well below the limit of .05, we can conclude that the correlation coefficients are statistically significant. Coefficient values can range from +1 to -1, where +1 indicates a perfect positive relationship, -1 indicates a perfect negative relationship, and 0 indicates no relationship exists.From table 4.38 we can see that the Pearson correlation between risk and Investor behaviour is .447 which indicates a moderate positive relationship. The Pearson correlation of bias with risk is .136 and bias with Investor behaviour is .134. This indicates that a positive but weak correlation between the three variables.

Hypothesis C

Socio-Demographic factors like Age, Gender, Income, Occupation does not influence the Investor behaviour

1. Age

H_0 : Age does not influence the Investor behaviour

H_1 : Age influences the Investor behaviour

2. **Gender**

H_0 : Gender does not influence the Investor behaviour

H_1 : Gender influences the Investor behaviour

3. Income

H_0 : Income does not influence Investor behaviour

H_1 : Income influences Investor behaviour

4. Occupation

H_0 : Occupation does not influence the Investor behaviour

H_1 : Occupation influences the Investor behaviour..

Table 4.40 Model summary of regression

R	R Square	Adjusted R Square	Std. Error of the Estimate
.510	0.26	0.253	0.69844

Source: SPSS output

Table 4.41ANOVAtest for Investor behaviour and socio demographic factors

		ANOVA(b)			
	Sum of Squares	df	Mean Square	F	Sig.
Regression	65.228	4	16.307	33.429	.000
Residual	185.369	380	0.488		
Total	250.597	384			

Source: SPSS output

Table 4.42Regression of Investor behaviour and socio demo factors

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.626	0.253		10.4	0
Occupation	.274	0.029	.338	7.06	0.02
Age	.292	0.036	0.5	8.136	0
Gender	.318	0.037	.526	8.494	0
Income	.313	0.027	518	11.481	0

Source: SPSS output

A regression analysis was done for the socio-demographic factors over the investor score to establish the relationship and validate the hypothesis. The ANOVA table shows a significant level of <.05 and hence this model can be accepted.

From the regression table above, e all the other variable have their significance level below .05, hence the null hypothesis for age, gender, occupation and income is rejected i.e. age, gender, occupation and income significantly influence the Investor behaviour.

4.8 Influence of behaviour biases onInvestor behaviour

Hypothesis D

H_0 Behaviour biases do not determine Investor behaviour

H_1 Behaviour biases determines the Investor behaviour

Table 4.43Model Summary of Investor behaviour and bias

R	R Square	Adjusted R Square	Std. Error of the Estimate
.134	0.18	0.15	0.80158

Source: SPSS output

Table 4.443ANOVA table depicting influence ofInvestor behaviour and bias

	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.511	1	4.511	7.021	.008
Residual	246.086	383	0.643		
Total	250.597	384			

Source: SPSS output

Table 4.45 Regression of Investor behaviour and bias

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.918	0.187		15.56	0
Bias	0.206	0.052	0.134	2.65	0.01

Source: SPSS output

A regression analysis was done to establish the influence of the predictor variable (bias) on the criterion variable (Investor behaviour) and validate the hypothesis. The ANOVA table shows a significant level of <.05 and hence this model can be accepted.

The standardized regression coefficient is the measure of how strongly each predictor variable influences the criterion variable. The standard co efficient of the predictor variable is 0.134 and so the regression equation can be written as:

Investor behaviour = 2.918+0.134*(bias)

From the above regression table null hypothesis is rejected because the significant level is less than .05 (p=.001, <.05) and reported that behavioural bias has a significant influence in determining Investor behaviour.

4.9Influence of risk onInvestor behaviour

Hypothesis E

H_0 Risk profile do not determine Investor behaviour

H_1 Risk profile determine the Investor behaviour

Table 4.46Model Summary of risk on Investor behaviour

R	R Square	Adjusted R Square	Std. Error of the Estimate
.447	0.2	0.198	0.72363

Source: SPSS output

Table 4.47ANOVAtable for risk and Investor behaviour

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	50.041	1	50.041	95.562	.000
Residual	200.557	383	0.524		
Total	250.597	384			

Source: SPSS output

Table 4.48Regression of Risk onInvestor behaviour

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.057	0.143		14.43	0
Risk	0.431	0.044	0.447	9.776	0

Source: SPSS output

A regression analysis was done to establish the influence of the predictor variable (risk) on the criterion variable (Investor behaviour) and validate the hypothesis. The ANOVA table shows a significant level of <.05 and hence this model can be accepted.

The standardized regression coefficient is the measure of how strongly each predictor variable influences the criterion variable. The standard coefficient of the predictor variable is .447 and so the regression equation can be written as:

Investor behaviour= 2.057+0.447*(Risk)

From the above regression table, null hypothesis is rejected because the significant level is less than .05 (p=.001, <.05) and reported that risk has a significant influence in determining Investor behaviour.

4.10Influence of behaviour biases on the risk profile of the investor

Hypothesis F

H_0 Behaviour bias of the investor does not have any significant relationship with the risk profile of the investor

H_1 Behaviour bias of the investor has a significant relationship with the risk profile of the investor

Table 4.49Model Summarybias on risk

R	R Square	Adjusted R Square	Std. Error of the Estimate
.435	0.19	0.16	0.83066

Source: SPSS output

Table 4.50ANOVA table for bias on risk

		ANOVA(b)			
	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.992	1	4.992	7.235	.007a
Residual	264.27	383	0.69		
Total	269.262	384			

Source: SPSS output

Table 4.51Regression of bias and risk

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	3.89	0.153		25.49	0
Risk	0.127	0.047	0.136	2.69	0.01

Source: SPSS output

A regression analysis was done to establish the relationship between risk and bias to validate the hypothesis. The ANOVA table shows a significant level of <0.05 and hence this model can be accepted.

The standardized regression coefficient is the measure of how strongly each predictor variable influences the criterion variable. The coefficient of the predictor variable risk is 0.136 and hence the regression equation can be written as

Bias = 3.9+ (0.136) * risk

From the above regression table, null hypothesis is rejected because the significant level is less than .05 (p=.001, <.05) and reported that risk has a significant influence on bias. Also, from the analysis it can be inferred that there exists a positive relationship between risk and bias to state that for every increase of a unit of risk there is anincrease in bias.

4.11Analysis of biases influencing the investor

In the current study out of the 20 items to identify the bias of the respondent, 10 items seek to find out the cognitive bias and 10 items for emotional bias of the respondents. In the current analysis these items are regressed on the investor choice to find out the influence of these biases on the investor choice

4.11.1 Biases influence on investor

The influence of biases on the investor is analysed to find out which of the two biases, cognitive and emotional bias has the most influence. Multiple regression analysis is done with the cognitive and emotional bias being the predictors and Investor behaviour as the dependent. The results of the analysis are presented below.

Hypothesis G

H_0 Emotional bias and cognitive bias do not significantly influence the Investor behaviour

H_1 Emotional Bias and cognitive bias significantly influence the Investor behaviour

Table 4.52Model summary Bias on Investor behaviour

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.575	0.331	0.327	0.55499

Source: SPSS output

Table 4.53ANOVA table for the regression of bias on Investor behaviour

ANOVA(b)					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	58.174	2	29.087	94.435	0.01
Residual	117.66	382	0.308		
Total	175.834	384			

Source: SPSS output

In the above analysis, table 6.64 shows a $R^2$of .331 which means that in the current model 33% of the variability is explained in the model. Since this is a study on human behaviour a $R^2$of .331 is accepted. Also, the ANOVA table 6.64 shows a significant value of .01 which is lesser than the accepted level of .05. Hence this model is accepted.

Table 4.54 Multiple regression of cognitive bias, emotional bias on Investor behaviour

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.855	0.281		13.715	0
Emobias	-0.623	0.061	-0.434	-10.269	0.04
CogBias	0.583	0.056	0.443	10.487	0.02

Source: SPSS output

Above regression is done to find the influence of the emotional bias and cognitive bias on the Investor behaviour and identify the dominating bias that influences the investor choice of the respondent. Emotional bias scores and cognitive bias score is regressed with Investor behaviourscore to find out the dominating bias.

From table 6.65, it can be inferred that in the current study the co-efficient of cognitive bias is quite big with a value of .443 and a significant level of .02 and emotional bias has a big negative co efficient score of .434 with a significance of .04. The negative relationship between emotional bias and Investor behaviour implies that with every unit increase in the predictor variable there is a decrease in the dependent variable Investor behaviour. The multi regression equation can be written as,

Investor behaviour = 3.855+.443(Cognitive bias) + (-.434)* (Emotional bias)

Hence from the above analysis, we can infer that both the biases significantly influence the Investor behaviour with the emotional bias having a negative relationship with the Investor behaviour.

4.11.2 Dominating bias influencing investor

The below analysis is done to establish the dominating bias out of the ten biases in the study. Multiple regression analysis is done with the Investor behaviour being the criterion variable and all the ten biases as the predictor variable.

Table 4.55ANOVA table for the regression of dominating bias on Investor behaviour

ANOVA(b)					
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	9.097	10	0.91	2.041	.029a
Residual	166.736	374	0.446		
Total	175.834	384			

Source: SPSS output

The ANOVA table has a significant level of .029, since it is less than .05 the model is accepted for the regression

Table 4.56 Model summary of dominating bias on Investor behaviour

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.227	0.52	0.57	0.6677

Source: SPSS output

In the above analysis, table 4.56 shows a R^2 of .27 which means that in the current model 22% of the variability is explained in the model. Since this is a study on human behaviour a R^2 of .26 is accepted. Also, the ANOVA table 4.55 shows a significant value of .02 which is lesser than the accepted level of .05. Hence this model is accepted.

Table 4.57Dominating bias influencing investor

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.511	0.216		16.237	0
Familiarity	0.164	0.079	0.224	2.073	0.039
Overconfidence	0.094	0.057	0.146	1.652	0.099
Endowment	0.096	0.076	0.125	1.261	0.208
Anchoring	0.094	0.057	0.118	1.662	0.097
Herding	0.06	0.043	0.112	1.382	0.168
Availabity	-0.003	0.05	-0.006	-0.065	0.948
Confirmatory	-0.007	0.041	-0.012	-0.178	0.859
Loss Aversion	-0.068	0.087	-0.106	-0.787	0.432
Mental accounting	-0.131	0.06	-0.191	-2.18	0.03
Self-control	-0.218	0.072	-0.294	-3.052	0.002

Source: SPSS output

The standardized regression coefficient is the measure of how strongly each predictor variable influences the criterion variable. If the beta value is high then the impact of the predictor variable on the criterion variable will be greater. Regression coefficient test results show which independent variable influences positively and negatively the dependent variable

From the regression table, it can be inferred that familiarity bias has a beta of .224 with a significant level of 0.039 which is the highest and self-control and mental accounting the least affecting biases with a beta value of -.294% & -.191and p levels of .002 & .03 respectively. Thus only familiarity bias, self-control and mental accounting bias is taken their significance limit is less than the accepted .05 level. Out of these three biases, familiarity bias is the most dominating bias which influences the risk in this particular study.

B. Exploratory Factor Analysis

4.12Factor analysis of the variables in the study

In the current study factor analysis was done for the two variables risk and bias to identify the factors with most loadings. Principal Component Analysis (PCA) and varimax rotation using SPSS have been done to identify the final factors of risk and bias.

4.12.1 Risk factor analysis:

Table 4.58 Measure of sampling adequacy-risk

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.618
Bartlett's Test of Sphericity	Approx. Chi-Square	1130.18
	df	45
	Sig.	.000

Source: SPSS output

Kaiser –Meyer –Olkin Measure is an index that define sampling adequacy. The KMO test in the current analysis is 0.618 which is more than 0.5 and can be considered acceptable and valid to conduct a data reduction technique.

Bartlett’s test of Sphericity helps to decide whether the results of factor analysis are worth considering and whether we should continue analysing the research work. Bartlett’s test of Sphericity has a significant level of <0.001 which shows that there is a high level of correlation between the variables which makes it adequate to apply factor analysis for the current study.

Table 4.59Communalities table-risk

Communalities		
	Initial	Extraction
RP1	1	0.808
RP3	1	0.63
RP2	1	0.833
RP4	1	0.825
RP5	1	0.547
RP6	1	0.586
RP7	1	0.406
RP8	1	0.504
RP9	1	0.478
RP10	1	0.44

Source: SPSS output

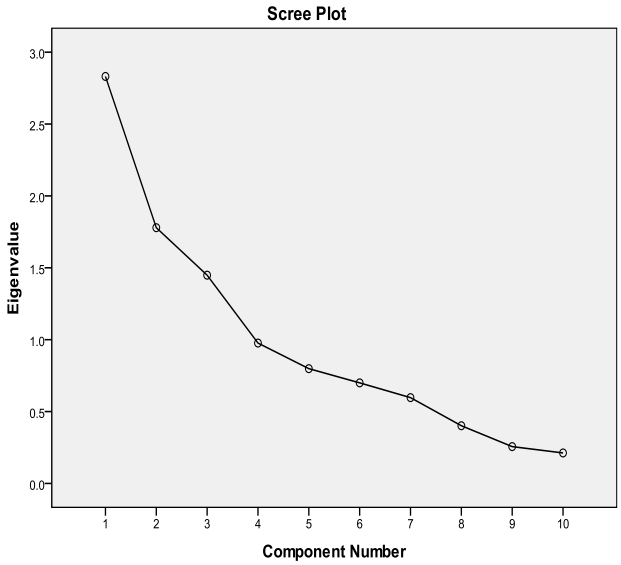
Every variable in the communality initially is expected to share a 100% variance. Hence initially every item is having a value of 1.00 which means 100% variance shared by each item. The extraction value is ranging from 0.406 to 0.833 which shows that the minimum share of the item after extraction is 40.6% and the maximum share of the item after extraction is 83.3%. The extraction method used is principal component analysis.

Table 4.60Total variance explained-risk

	Total Variance Explained								
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.831	28.312	28.312	2.831	28.312	28.312	2.452	24.522	24.522
2	1.779	17.79	46.101	1.779	17.79	46.101	1.901	19.013	43.535
3	1.449	14.486	60.588	1.449	14.486	60.588	1.705	17.053	60.588
4	0.977	9.765	70.353						
5	0.798	7.985	78.337						
6	0.7	6.996	85.334						
7	0.597	5.969	91.302						
8	0.401	4.014	95.317						
9	0.256	2.562	97.879						
10	0.212	2.121	100						

Source: SPSS output

Fig: 4.8 Scree plot for risk factor



Source: SPSS output

The total variance contributed by the first component is 24.52%, by the second component is 19.01% and by the third component is17.05%. The Eigenvalue for a given factor measures the variance in all the variables which is accounted for by that factor. It is also clear that there are three distinct components having Eigenvalues greater than 1 from the given set of variables. Eigen value for factor one is 2.831, for factor two is 1.779 and for factor three is 1.449.Since all the three factors are having Eigen values greater than 1 and sharing maximum variance hence they are essential in the present study. Also in all the three factors 61% of the variance is explained.The Scree plots show the components as the x-axis and the corresponding Eigenvalues as the Y axis.First three components are considered whose Eigen value are2.831,1.779 and 1.449.Since all these factors are having Eigen value greater than 1 and sharing maximum variance hence they are essential in the present study.

Risk factors extraction

The Extraction Method used is Principal Component Analysis and the Rotation Method used is Varimax with Kaiser Normalization.

Table 4.61 Rotated component matrix-risk

	Component		
	1	2	3
RP1	0.008	0.894	-0.09
RP2	0.074	0.908	0.06
RP3	0.643	0.175	0.431
RP4	0.866	-0.208	0.18
RP5	0.725	-0.023	-0.146
RP6	0.713	0.274	-0.056
RP7	0.425	0.345	0.327
RP8	0.161	0.071	0.688
RP9	0.101	-0.058	0.682
RP10	-0.182	-0.033	0.637

Source: SPSS output

Table 4.62 Rotated component matrix-risk

Factors	Items	Rotated Loading	Item Description	Components
1	RP4	0.866	On your regular visit to the restaurant, the waiter says the chef has cooked something new and wants you to try the new dish. You will take the risk and order the new dish	**Investment risk**
	RP5	0.725	While filing your income tax returns you find out that by concealing certain income you can save some tax, you will go ahead in concealing it even though there is a risk that you might be exposed	
	RP6	0.713	You investment goes down by 10%, your response	
	RP7	0.425	On an investment portfolio of 1 lakh, if due to market conditions, your portfolio falls to Rs. 85,000 within a month,	
	RP3	0.431	During the regular visit to the Departmental store, the salesperson recommends a product which you buy	
2	RP2	0.908	If you had to choose between two jobs, which would be like to pick?	**General risk**
	RP1	0.894	How would you `honestly' describe yourself as a risk-taker? I am a risk taker	
3	RP8	0.688	You are on a TV game show and can choose one of the following. Which option would you take considering the given risks?	
	RP9	0.682	You have saved 10% of your gross annual salary and an investment opportunity is presented. You have a 50/50 chance that the value of your investment will triple over the next three years or that you will lose the entire amount invested. What will you do?	**Speculative risk**
	RP10	0.637	On a Holiday you visit a casino as part of your tour and you happen to win a sizable amount. Your next option will be	

Factor 1: The Eigenvalue of factor 1 is 1.8825 with 28.312% of Variance. The variables are related to Factor 1 has very high significant loading on the variable RP4 (0.866), on the variable RP5 (0.725) and on the variable RP6 (0.713) and marginally significant loading on the variable RP7 (0.425). This factor 1 is labelled as **INVESTMENT RISK**as two items in this factor pertain to investment.

Factor 2: The Eigenvalue of factor 2 is 1.901 with the variable RP2 having a loading of 0.908 and RP1 0.894. The factor is labelled as **GENERAL RISK**as both the items seeks response to general risk.

Factor 3: The Eigenvalue of factor 3 is 1.705 with the variables RP3, RP8, RP9, and RP10 having a loading of 0.431, 0.688, 0.682, and 0.637 respectively. Out of the four items, three items seek responses to hypothetical speculations. Hence this factor is labelled as **SPECULATIVE RISK**.

4.12.2 Bias factor analysis

Table 4.63Measure of sampling adequacy -Bias

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.656
Bartlett's Test of Sphericity	Approx. Chi-Square	2498.89
	df	45
	Sig.	0

Source: SPSS output

Kaiser –Meyer –Olkin Measure is an index that define sampling adequacy. The KMO test value is 0.656 which is more than 0.5 and can be considered acceptable and valid to conduct data reduction technique.

Bartlett's test of Sphericity helps to decide whether the results of factor analysis are worth considering and whether we should continue analysing the research work. Bartlett's test of Sphericity has a significant level of <0.001 which shows that there is a high level of correlation between the variables which makes it adequate to apply factor analysis.

Table 4.64Communalities table-bias

	Communalities	
	Initial	Extraction
Loss Aversion	1	0.917
Overconfidence	1	0.896
Confirmatory	1	0.861
Familiarity	1	0.859
Herding	1	0.858
Mental accounting	1	0.841
Availabity	1	0.823
Endowment	1	0.802
Anchoring	1	0.793
Self-control	1	0.785

Source: SPSS

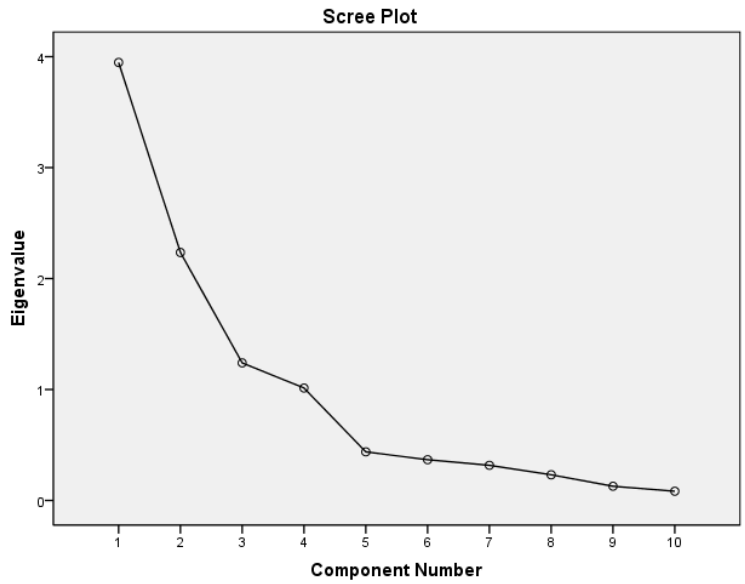
The extraction method used is principal component analysis. Every variable in the communality initially is expected to share a 100% variance. Hence initially every item is having value of 1.00 which means 100% variance shared by each item. The extraction value is ranging from 0.917 to 0.785 which shows that minimum share of item after extraction is 78.5% and the maximum share of item after extraction is 91.7%.

Table 4.65Total variance explained- bias

	Initial Eigenvalues			Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Total	% of Variance	Cumulative %
1	3.947	39.475	39.475	3.947	39.475	2.6	25.987	25.987
2	2.235	22.351	61.826	2.235	22.351	2.26	22.592	48.579
3	1.24	12.397	74.223	1.24	12.397	1.82	18.191	66.771
4	1.013	10.133	84.355	1.013	10.133	1.76	17.585	84.355
5	0.438	4.379	88.735					
6	0.367	3.672	92.407					
7	0.317	3.169	95.576					
8	0.231	2.313	97.89					
9	0.128	1.279	99.169					
10	0.083	0.831	100					

Source: SPSS output

Fig 4.9 Scree plot for bias



Source: SPSS output

The total variance contributed by the first component is 25.987%, by the second component is 22.59%, the third component is 18.19% and the fourth component is 17.58%.The Eigenvalue for a given factor measures the variance in all the variables which is accounted for by that factor. It is also clear that there total four distinct components are having Eigenvalues greater than 1 from the given set of variables. Eigenvalue for factor one is 2.6, for factor two is 2.26, factor three is 1.8 and for the fourth factor, it is 1.76.Since all the four factors are having Eigenvalues greater than 1 and sharing maximum variance hence they are essential in the present study. Also in all four factors 84.35% of the variance is explained.The Scree plots show the components as the x-axis and the corresponding Eigenvalues as the Y axis.First four components are considered whose Eigenvalue are 2.6, 2.26, 1.8 and 1.76.Since all these factors are having Eigenvalue greater than 1 and sharing maximum variance hence they are essential in the present study.

Bias factor extraction

The Extraction Method used is Principal Component Analysis and the Rotation Method used is Varimax with Kaiser Normalization.

Table 4.66Rotated component matrix-bias

	Component			
	1	2	3	4
Familiarity	0.898	0.174		0.15
Loss Aversion	0.859	0.411		
Availabity	0.672		0.608	
Herding	0.147	0.904	0.138	
Self-control	0.463	0.754		
Endowment	0.549	0.631	-0.168	0.273
Overconfidence		0.119	0.932	0.111
Mental accounting		-0.247	0.63	0.613
Confirmatory	0.163			0.914
Anchoring	-0.174	0.448	0.356	0.66

Source: SPSS output

Table 4.67Rotated component matrix-bias

Factors	Items	Rotated loadings	Item Description	Components
1	Familiarity	0.898	You tend to stick to tested and tried investments like Gold and Properties rather than explore new investment avenues	Identification behaviour
	Loss aversion	0.859	You would rather not lose Rs.1000 than earn Rs.3000	
	Availability	0.672	You tend to make investments based on tips from news channels and magazines rather than understanding them	
2	Herd mentality	0.904	Other investors' decisions have an impact on you investment decisions	Control behaviour
	Self-control	0.754	You divide your money into, money for investment and money for daily spending	
	Endowment	0.631	You had invested your money in gold for your wife and children. It holds a lot of sentimental value to you. Even during hard times when you are left with no other option, you will not sell the gold to take care of your commitments	
3	Overconfidence	0.932	When you purchase an investment and it happens to be a winning one, you feel that it is purely because of my knowledge and actions	Confidence behaviour
	Mental Accounting	0.63	You divide your money into, money for investment and money for daily spending	
4	Confirmatory	0.914	You always consult others before making an investment decision	Confirmation behaviour
	Anchoring	0.66	You are planning to invest in stocks and the first stock you identify is priced at Rs.1000 per share and the second one and the third one is below Rs.1000 per share. You feel that the first one is expensive	

Factor 1: The Eigenvalue of factor 1 is 2.6 with 25.98% of Variance. The variables related to Factor 1 has very high significant loading on the variable Familiarity (0.898), on the variable loss aversion (0.859) and the variable Availability (0.672). The factor has the items of familiarity and availability wherein both the items the respondent tends to identify with things familiar or available. Hence this factor is labelled as **IDENTIFICATION BIASNESS**.

Factor 2: The Eigenvalue of factor 2 is 2.26 with 22.59% of variance explained. The variables related to factor 2 has a very high significant loading on the variable Herd mentality (0.904), self-control having 0.754 and endowment having 0.631. In this factor two of the items, self-control and endowment display the respondent's restraint and hence the factor is labelled as **CONTROL BIAS**.

Factor 3: The Eigenvalue of factor 3 is 1.82 with 18.91% of variance explained. The variables over-confidence and mental accounting have a significant loading of 0.932 and 0.63. Since in this factor over-confidence bias has the maximum loading of .932 this factor is labelled as **CONFIDENCE BEHAVIOUR**.

Factor3. The Eigenvalue of factor 4 is 1.76 with 17.58% of the variance explained. The variables Confirmatory and Anchoring have a significant loading of 0.914 and 0.66 respectively. Since both the items are related to confirmations before action is taken, this factor is labelled as **CONFIRMATION BEHAVIOUR**.

C. MEDIATIATION ANALYSIS ON THE VARIABLES IN THE STUDY

4.13 Mediating role of independent variables and the dependent variable

Hypothesis G

H_0 Risk does not play a mediating role between Behaviour bias and Investor behaviour

H_1 Risk plays a mediating role between Behaviour bias and Investor behaviour

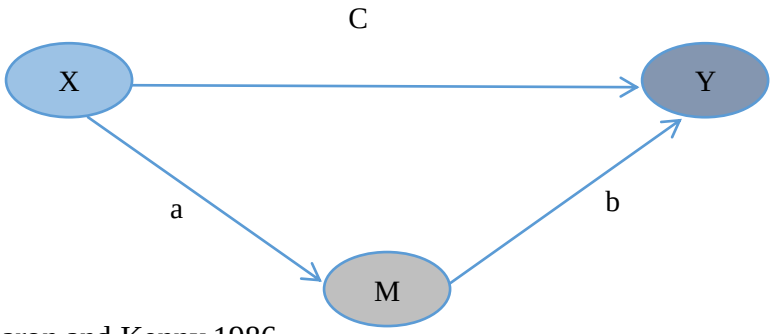
In the current study, the causal relationship between the independent variable and the dependent variable is studied. Also, another independent variable is checked if it mediates or intervenes between the independent and dependent variable. Mediation in other words is the transmission of the independent variable effect on the dependent variable through the mediating variable.

Assuming the independent variable as X, the dependent variable as Y and the mediating variable as M, the mediating model can be represented as per fig.4.10

Table 4.68 Classifications of variables

Independent Variable	Bias
Mediating variable	Risk
Dependent variable	Investor behaviour

Fig4.10Conceptual model of mediating variable



Source: Baron and Kenny 1986

The current study looks at establishing risk as a mediating factor between bias and investment choice. Also, this study looks at establishing if the mediating factor is total or partial.

Mediation can either be total or partial. In complete mediation, the entire effect of the independent variable on the dependent variable is transmitted through the mediator variable(s) and hence there is no direct effect of the independent variable on the dependent variable.

In a partial mediation, there is a direct effect on the dependent variable and the indirect effect is passed on by the mediating variable(s). The indirect effect can be represented by C=c'+ab, where a b is the product of the coefficients of path A and path B and the c' is the coefficient of path C when the model is controlled by the mediating variable.

The current study follows the four-step mediation analysing method proposed by Baron and Kenny 1986

1. The Independent variable X should be correlated to the dependent variable Y significantly

Table 4.69Correlation between bias and Investor behaviour

	Correlations		
		Bias	Investor
Bias	Pearson Correlation	1	.134**
	Sig. (2-tailed)		0.008
	N	385	385
Investor behaviour	Pearson Correlation	.134**	1
	Sig. (2-tailed)	0.008	
	N	385	385
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS output

From the above table, the predictor variable has a positive correlation with the criterion variable Investor behaviour as per the Pearson correlation test. Also, the significance value is 0.008 which is well below the accepted .05 level.

Table 4.70 Bivariate regression of bias and Investor behaviour

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.918	0.187		15.56	0
Bias	0.206	0.052	0.134	2.65	0.01

Source: SPSS output

The bivariate regression of bias on investor shows a co-efficient of 0 .134.

2. The independent variable should be significantly related to the mediator variable

Table 4.71 Correlation between bias and risk profile

	Correlations		
		Bias	Risk
Bias	Pearson Correlation	1	.136**
	Sig. (2-tailed)		0.007
	N	385	385
Risk profile	Pearson Correlation	.136**	1
	Sig. (2-tailed)	0.007	
	N	385	385
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS output

From the above table, the predictor variable has a positive correlation with the mediating variable risk as per the Pearson correlation test. Also the significance value is 0.007 which is well below the accepted .05 level.

Table 4.72 Bivariate regression of bias and risk

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	3.89	0.153		25.49	0
Risk	0.127	0.047	0.136	2.69	0.01

The bivariate regression of bias on investor shows a co-efficient of 0.136.

3. The mediator variable should be significantly related to the dependent variable

Table 4.73 Correlation between risk and Investor behaviour

	Correlations		
		Risk	Investor
Risk	Pearson Correlation	1	.447**
	Sig. (2-tailed)		0.004
	N	385	385
Investor behaviour	Pearson Correlation	.447**	1
	Sig. (2-tailed)	0.004	
	N	385	385
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS output

From the above table, the mediating variable has a positive correlation with the criterion variable investor behaviour as per the Pearson correlation test. Also, the significance value is 0.004 which is well below the accepted .05 level.

4. The independent variable should not be significantly related to the dependent variable when controlled by the mediating variable.

To check the above condition multiple regression was done with bias as the independent variable, Investor behaviour as the dependent variable and risk as the mediator variable.

Table 4.74 Model summary of multiple regression risk, bias and Investor behaviour

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.488	0.238	0.234	0.70682

Source: SPSS output

Table 4.75ANOVA table of multiple regressions

ANOVA(b)					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	59.751	2	29.876	59.8	.000a
Residual	190.846	382	0.5		
Total	250.597	384			

Source: SPSS output

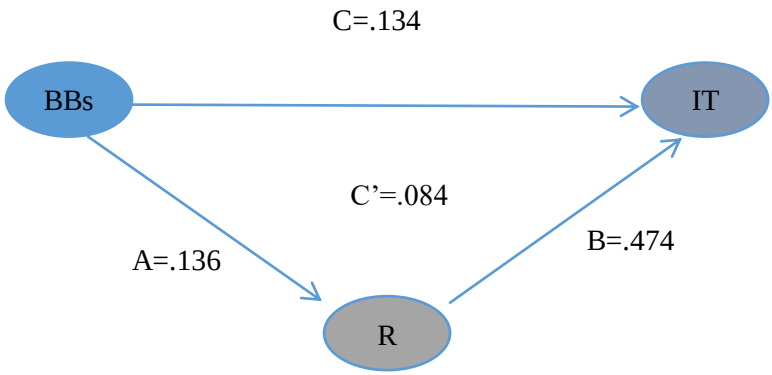
Table 4.76 Multiple regression of bias (IV), risk (MV) and Investor behaviour (DV)

Coefficients(a)					
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	1.257	0.229		5.499	0
Bias	0.139	0.047	0.084	4.409	0
Risk	0.457	0.043	0.474	10.515	0

Source: SPSS output

The regression results show that adjusted R^2 as .234 which can be considered in the study of human behaviour. Also, the ANOVA table shows a significance level of <.05 and hence this model can be accepted.

Fig 4.11 Mediating model analysis



The value of C reduces from 0.134 to C'0.084. Hence risk as a mediating variable is accepted.

According to Baron and Kenny, if all the four conditions are satisfied then it is a total mediation and if the first three conditions are satisfied and the fourth is not satisfied it is a partial mediation.In the current study, the first three conditions are satisfied but the direct effect is not totally absent for the fourth condition. Hence, the mediating variable is not total but partial.

4.13.1 Direct effect

The total effect C is got by regressing the predictor variable on the criterion variable. i.e. path C. Path C value reduces significantly on account of the mediator value from .134 to .084 (which is the direct effect C') with the introduction of the mediating variable and the significance level below .05. Hence, risk as a mediating variable is accepted. If the residual factor of path C is not zero, then there exists a strong case of other mediating factors in the model. From the analysis, it can be seen that the effect only reduces and is not fully absent; the mediating effect is only partial and not total.

4.13.2 Indirect effect

The indirect effect in the model is the product of path a and path bwhen the multiple regression analysis is done with the mediating variable.

A=.136, S_a=.047

B=.474, S_b=.043

Where A is the coefficient and S_a is the standard errorof risk in the bivariate regression (table 6.63) and B is the coefficient of risk and S_b is the standard error of risk in the multi-linear regression(table 6.67).

The indirect effect of the model is A*B hence,

0.136 * 0.474 =0.0644

4.13.3 Sobel test using the standard error estimates of path a and path c.

Sobel test equation

z-value = $a*b$/SQRT ($b^2*s_a^2 + a^2*s_b^2$)

Where the values of a (beta of path a) and S_a (standard error of path a) after regression analysis is done with the independent variable (Bias) predicting the mediator variable (Risk)

A=.136, S_s=.047

B= .474, S_b=.043

Using the Preacher K J, online web page of sobel test, we get

Table 4.77 Sobel test statistics

	Input:		Test statistic:	Std. Error:	p-value:
a	0.136	Sobel test:	2.79879521	0.02303277	0.00512937
b	0.447	Aroian test:	2.78808292	0.02312126	0.00530210
S_a	0.047	Goodman test:	2.80963194	0.02294393	0.00495982
S_b	0.043				

Source:results got from K J Preacher online calculator

The reported p-values (rounded to 8 decimal places) are drawn from the unit normal distribution under the assumption of a two-tailed z-test of the hypothesis that the mediated effect equals zero in the population. +/- 1.96 are the critical values of the test ratio which contain the central 95% of the unit normal distribution. The p-value is less than .05 and hence the Soble test hypothesis assuming the meditative effect to be zero is rejected. Hence the mediating model with an indirect effect of 0.0644 with a p value of 0.00512937 is accepted and risk as a partial mediating variable is accepted.

Thus, from the above analysis, we can infer that risk as a mediating effect is only partial and not total. The partial effect could be because of the presence of other mediating variables like age, gender etc., which influences the respondent's investment choice.

Hypothesis I. Relationship between risk and actual investment behaviour

H_0 Risk taking ability does not influence the investment preference

H_1Risk taking ability significantly influence the investment preference

Pearson correlation coefficient test was done to study the relationship between the, risk profile and the investor behaviour when they have to choose among different investment products. The investment products are classified below based on their risk category.

Table 4.78 Correlation between risk profile and investment behaviour

		Risk	Behaviour
Risk	Pearson Correlation	1	.285
	Sig. (2-tailed)		0
	N	385	385
ActualIBeh	Pearson Correlation	.285	1
	Sig. (2-tailed)	0	
	N	385	385

Source: SPSS

From the above table, the p-values for the correlation between risk and investor actual behaviour is .007. Since thevalue is well below the limit of .05, we can conclude that the correlation coefficients are statistically significant. Coefficient values can range from +1 to -1, where +1 indicates a perfect positive relationship, -1 indicates a perfect negative relationship, and 0 indicates no relationship exists. From table 4.76 we can see that the Pearson correlation between risk and Investor behaviour is. .285 which indicates a moderate positive relationship.

A regression analysis was done to analyse the influenceof risk on investment behaviour to validate the hypothesis. The ANOVA table shows a significant level

of <0.05 and hence this model can be accepted.

Table 4.79 Model summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.90	0.81	0.79	0.7229

Table4.80 ANOVA table for Risk on actual investor behaviour

	Sum of Squares	df	Mean Square	F	Sig.
Regression	17.695	1	17.695	33.861	.000
Residual	200.149	383	0.523		
Total	217.844	384			

Source: SPSS

Table 4.81 Regression of Risk on actual investor behaviour

		Coefficients(a)			
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	2.667	0.142		18.731	0
Risk	0.256	0.044	0.285	5.819	0

Source: SPSS

The standardized regression coefficient is the measure of how strongly each predictor variable influences the criterion variable. The coefficient of the predictor variable risk is 0.256 and hence the regression equation can be written as

Investor behaviour = 2.667+ (0.256) * risk

From the above regression table, null hypothesis is rejected because the significant level is less than .05 (p=.001, <.05) and reported that risk has a significant influence

on the actual investor behaviour. Also, from the analysis it can be inferred that there exists a positive relationship between risk and actual investor behaviour to state that for every increase of a unit of risk there is an increase in the actual investment behaviour.

4.14 Summary:

In this chapter, analysis was done with the data collected to establish the formulated hypothesis in line with the objectives of the study. The findings of the study are presented in the subsequent chapter.

CHAPTER 5

RESULTS, DISCUSSION AND CONCLUSION

CHAPTER 5

RESULTS, DISCUSSION AND CONCLUSION

5.1 Overview

A study was done on the risk attitude and behaviour of the retail investors in Chennai. The risk profile of the investor and the behaviour bias associated with the investor when making investment decisions was analysed using statistical tools and techniques. As such, the data analysis was presented in the previous chapter. The current chapter discusses the results of the data analysis and the implications of the study and chapter closes with concluding remarks on the study. As such, the chapter is divided into,

A. Results of the study

- Variable relationship summary
- Findings aligned with objectives

B. Discussion

- Investor's information source and investment preference
- Socio-demographic analysis(age, gender, income, occupation)
- Identifying the risk profile of investors and bias profile of investors
- Identifying Investor behaviour based on investment scenarios
- Socio-demographic relationship with the risk profile of investors
- Socio-demographic relationship with bias profile of the investor
- Socio-demographic relationship with Investor behaviour
- Risk profile and bias profile relationship of investors
- Establishing biasness as a mediating variable from risk to investment
- Identifying the most influencing bias that determines the risk profile

C. Implications of the study

D. Conclusion

A. RESULTS OF THE STUDY

5.2 Variables relationship summary:

a) Relationship between Behaviour Biases and Investor behaviour

In the current study, bivariate regression was done with the bias being the predictor and Investor behaviour as the criterion variable. It was found that biases have a significant influence in determining Investor behaviour.

b) Relationship between Risk profile and Investor behaviour

In the current study, bivariate regression was done with risk being the predictor and Investor behaviour as the criterion variable. It was found that risk has a significant influence in determining Investor behaviour.

c) Relationship between Behaviour biases and the Risk profile of the investor

In the current study, bivariate regression was done with bias being the predictor and risk as the criterion variable. It was found that bias has a significant influence in determining Risk.

d) Mediating role of independent variables and the dependent variable

In the current study, the bias score is taken as the independent variable and the investment decision score which determined the Investor behaviour is taken as the dependent variable. Risk is taken as the variable which mediates the cause and effect relationship between bias and investment decisions. By using meditational analysis, risk is established as the mediating variable with a partial effect on the causal relationship between bias and Investor behaviour.

e) Dominant Bias influencing Investor behaviour

The current study aimed to find out the dominating bias which influences investment decisions. It was found that emotional bias is the dominant bias influencing the investment decision of Investors in Chennai.

f) Correlation between Bias, Risk and Investor behaviour

In the current study, Pearson correlation test was done with the three variables to find out the correlation among the variables. It was found that all three variables under study have a positive correlation with each other significantly.

g) Dominant bias Analysis on Investor behaviour

The current study aimed to find out the dominating bias which influences investment decisions. Familiarity bias is the dominating bias whereas self-control bias and mental accounting bias are the least affecting biases.

5.3 Findings aligned to Objectives

Table 5.1 Objectives and findings

	Objective outline	**Results from study**
1	Is the risk profile influenced by the socio-demographic factors of the investors in Chennai?	All the factors like age, gender, occupation and income significantly influence the risk-taking ability of the investor
2	Is the investment behaviour influenced by the risk-taking ability?	In this study, the investment behaviour is significantly influenced by the risk taking ability
3	Does behaviour bias influence investment behaviour?	In this study, the investment behaviour is significantly influenced by the behaviour bias

4	Does behaviour bias influence the risk-taking ability	Behaviour bias significantly influences the risk taking ability
5	Establishing risk tolerance as the mediating variable between behaviour bias and investment decision	Risk tolerance is established as a partial mediating variable that influences behaviour bias in taking investment decisions
6	Does the risk taking abilty affect the actual investment behaviour	The risk taking ability influences the behaviour in choosing financial products

B. DISCUSSION ON THE FINDINGS

5.4 Investor's preference, goals, information

5.4.1 Investment Knowledge: Out of the 385 respondents, 40% responded that they have moderate knowledge of investments, 20% claimed to be knowledgeable, 15% felt that they are experienced investors and 25% felt that they are beginners in investment. Hence we conclude that investors in Chennai have a moderate knowledge of what investment is and the different avenues of investment.

5.4.2 Investment goal: The goal for which the respondents are investing was identified and accordingly ranked based on the weightage allocated to each goal. Based on the data collected children's future concerning education and marriage was top-ranked in the investor goals followed by retirement allocation and purchase of assets like house and car. Saving for emergencies and going ona vacation abroad was the least preferred. Investors in Chennai who are in the less than 40 age group consider their children's future as the top priority in investment followed by buying property and retirement plans. For investors in the age group between 50 -60, retirement plans are more or less at the top. This can be due to the accomplishment of their children needs and hence looking more to towards their retirement. Of all

the goals for investing, saving for a vacation abroad and for charities is the least ranked for the age group under 50. However, in the >60 age group, having a corpus for charities is seen repeatedly.

5.4.3 Investment preference: Of the 385 respondents fixed deposits rank among the top among all investment avenues in Chennai. Gold is also the most preferred avenue of investment for investors in Chennai. Both FDs and gold are ranked equally implying that there is no major difference between investment in FDs and gold. Investing in real estate is also among the top 3 next to FDs and gold. Investors tend to shy away from investing in direct equity and through mutual funds. This could be because of their averseness towards risk, their biasness or lack of proper knowledge of equity.

5.4.4 Investment source: The investment source for each respondent was identified and accordingly ranked based on the weightage allocated to each source. Based on the data collected, the most preferred source of investment was from friends and family followed by information from newspaper and magazines. Information from TV channels is ranked 3rd among the source of investment information for the investors in Chennai. The least source of investment information was from blogs and social media.

With the increasing awareness of getting professional help in advising, financial advisors are much sought after these days but among the investors in Chennai, it is ranked fourth followed by financial websites and blogs.

5.5 Demographics

Of the total respondents, 76% were Males and 24% were females while the third category of transgender could not be interviewed

Of the total respondents, 60% were equally distributed between 5-20lakhs income package, while 15% was below 3 lakhs and another 15% was between 10-20 lakhs. However, the highest-earning respondent, greater than 20 lakhs was only 8%.

Though the study aimed to cover the occupation of the respondents equally, a lot of salaried and professionals were approached because of the ease of contacting to get the questionnaires filled. Others category is the few housewives who were interviewed.

Since corporates were approached to get the questionnaires done, a major portion of the respondents belonged to the 30-40 age group followed by the less than 30 age group.

5.5.1 Demographics and Risk classification

A majority of close to 40% are risk-neutral among the respondents followed by somewhat risk seeker at 30% and somewhat risk-averse at 26%. There are very few scores in the extremities with risk seekers being 3% and risk-averse 0%. Investors in Chennai mainly fall in the risk-neutral category of risk profile and tend to be equally distributed towards somewhat risk-seeking and being somewhat risk-averse.

5.5.1.1Gender and Risk:

Of the 385 respondents, 295 were men and the remaining 90 were women. Among the 295 men, 120 i.e. 40% were risk-neutral and the remaining equally distributed

among the somewhat risk-seeking and being somewhat risk-averse. Among the 90 women, 32 were risk-neutral and 34 were risks-seeking i.e. 37% of the women are willing to take risk compared to 33% of the men. This implies that women can be more risk-seeking than men.

5.5.1.2 Risk and Age

In the above 60 age group category, 58% tend to be on the risk-averse side and 38% risk-neutral with only 8% being risk-seeking. On the contrary in the less than 30 age category, 55% seem to be risk-seeking with 37% being risk-neutral and hardly 1% was risk-averse. In the 50-60 age slab, investors risk averseness was at 40% risk-neutral at 40% and risk-seeking was only at 20%. Also in the 30-40 slab, only 20% were risk-averse and the balance was equally distributed among risk-neutral and risk-seeking.

5.5.1.3Occupation and Risk

In this section, risk profiling is done based on the profession of the investors. It was found that 59% of the retired people were risk-averse and nearly 40% of them are risk-neutral. Professionals like doctors, advocates etc., tend to be more risk-neutral at 43% while the remaining is equally split among risk-averseness and risk-seeking. All three housewives were risk-neutral. Interesting to note that 47% of the salaried class were risk seekers while only 29% of the business class were risk-seeking. Again only 29% of the salaried class were risk-averse compared to the 27% risk-averseness among business people.

5.5.1.4Income and Risk

A majority of the respondents are in the 3-5 lakhs and 5-10 lakhs. In this, nearly 40% were in the risk-neutral territory while the balance was more or less equally

distributed between somewhat risk-averse and somewhat risk-seeking class. The creamy category of >20 lakhs was more or less equally distributed among the different classes of risk.

The maximum risk-seekers 63% was found in the <3 lakhs category and the maximum number of risk-aversion 44% was found in the 10-20 lakh slab. Interestingly, the 5-10lakh was equally distributed across the five risk categories. In the greater than 20 lakh slab, risk-awareness was at 39%, risk-neutral as at 32% and the remaining 29% were risk-seekers.

Socio-demographic relationship with the risk profile of investors

Multiple regression analysis was done to test the relationship between risk and socio-demographic factors like age, gender, income, occupation. From the analysis, it was found that all the variables like age, gender, occupation and income significantly influence the risk-taking ability of the investor.

5.5.2Demographics and Bias

Of the total respondents, 56% were somewhat biased followed by bias neutral at 25%. Only 3% were totally biased while there was 0% who showed total non-biasness. Only 15% were somewhat unbiased in their responses. This implies that the respondents constituting 60% are biased in their investment decisions.

5.5.2.1 Bias and gender

More than 50% of both men and women tend to be somewhat biased in their investment decisions with men 27% and women 205 being bias neutral. Hence it

can be concluded that close to 60% of both men and women investors in Chennai are biased in their investment decisions.

5.5.2.2Age and Bias

The respondents were equally distributed across the different age groups with the age group 30-40 exhibiting the most response with 102. From the data, it is observed that a majority (217) of the respondents belong to the somewhat bias category. Out of this the 30-40 category were the most number followed by the 40-50 age group.

In the 40-50 age group, 75% of the respondents were biased and 25% were bias neutral. Again in the 30-40 age group, 84% were biased, 14% were bias neutral and the remaining 2% somewhat not biased. The greater than 60 age group were 42% bias neutral and 45% with bias.

So it is concluded that 60% of the investors in Chennai have a biased attitude when it comes to making investments.

5.5.2.3 Occupation and Bias

From the study, it can be seen that 60% of the respondents tend to be biased on the investment decisions followed by bias neutral at a distant 26% and somewhat unbiased at 14%. 4% tend to exhibit total biasedness in their investment decisions with the maximum being in the retired class. Salaried and professionals tend to be somewhat biased than the business and other class.

5.5.2.4 Income and Bias

According to the study, investors in both the 3-5 lakh and 5-10 lakhs income slab are biased in their investment decisions. Also, 34% of the investors in the 3 lakh income level are unbiased in their investment decisions. Only 25% are bias neutral across all income levels and only less than 14% are somewhat unbiased in their investment decisions except for those investors in the less than 3 lakh income level.

5.5.3Demographics and Investor behaviour

In this, the type of investor is identified based on certain investment scenarios and accordingly the type of investor is categorised. The study scores show that 45% of the sample are somewhat risk-seekers followed by risk-neutral in making investment decisions. However, only 14.6% are somewhat risk-averse and totally risk-averse.

The study shows a significant level of correlation among the three variables risk, bias and Investor behaviour.

From the study done, all the social demographic factors like age, gender, occupation and income significantly influencetheInvestor behaviour

C. IMPLICATIONS OF THE STUDY

5.6.1 Academic implications:

Apart from the findings, this paper will help further researchers by way of the literature survey and review done. Based on the research methodology, design, data survey, data analysis and interpretation further research can be started fromwherethis study ends.

5.6.2 Financial Planners and Advisers implications:

This research will help the advisers in this profession to understand the various behaviour biases, the risk classification and how it affects the investor'sdecision making capability. This will help them to adjust and adapt according to their client needs.

5.6.3 Investors implication:

This paper will serve as a reference to all the investors as to what bias and risk tolerance is and how it affects their investment decisions. Once it is understood, the investors can shed off their biasness in a significant manner so that they can make rational investment decisions according to their needs.

5.7 Limitations of the study and further scope:

1. The current study was done in urban Chennai and the suburban areas were left out. Hence to generalize the findings of the study toPAN India, it needs to be done cautiously. Thus there is enormous scope to extend the study to suburban and rural parts of India.

2. This study took only a few social demographic factors for analysis that was felt relevant to the study.There are other factors like education, marital status etc., which can be taken for further study if found appropriate and find out their relationship with the risk profile and behavioural bias.

3. This study took only ten biases for analysis. Further studies can be done using the other biases that are not taken in this study such as narrative fallacy, self-serving bias, framing etc.

4. The Risk tolerance of the individual varies with time, lifestyle and need. This study was done over a period of time and hence the same risk profile may not be applicable now. The riskprofiling done in the study was done using a simple method of assigning scores to each response and finding the risk tolerance. Thus more advanced techniques and tools need to be explored and used to classify the risk-tolerance of investors.

5. This study can be used for further research on behaviour bias affecting the risk-taking capacity of the investor.

6. The components identified in the factor analysis can be used in further studies on risk profile and behavioural bias.

D. CONCLUSION

5.8 Concluding remarks:

Before liberalisation in India, investment in assets more or less involved in investing in properties, gold, fixed deposits among all the classes with the rich and affluent investing in shares of publicly listed companies. With the introduction of risky asset classes like MFs, ULIPs, there is a compelling need to understand investment in the area of risk capacity and behaviour bias of the investor.

The current study attempts to analyse the risk-taking capacity and bias present among the retail investors in Chennai. The findings of the study proved that biases present in the investor significantly influence the decision of the investor when making an investment decision.

The model established in the study also proved conclusively the risk-taking capacity of the investor also affects the investor's decision when making investment decisions.

Also, the study takes a detailed view of the behaviour biases present in the investor along with the risk-taking capacity of the investor. The study is highly relevant in the current investment scenario as it throws insight into the risk propensity and biases along with the cross-sectional relationship with socio-demographic factors like age, gender, income, occupation. Researchers in the investment domain can use this study to do further studies and investment advisors can use this study to understand behaviour bias and risk propensity to give appropriate advice to theirclients.

BIBLIOGRAPHY

Books

1. Ashcraft, M.H. (2006). Cognition. Upper Saddle River, New Jersey; Pearson Education Inc. ISBN 013198229X

2. Bless, H., Fiedler, K., & Strack, F. (2004). Social cognition: How individuals construct social reality. Hove and New York: Psychology Press.

3. Garman, E.T., &Forgue, R.E. (2003). Personal finance (7th ed.) Boston: Houghton Mifflin.

4. Kahneman,D.(2011). Thinking, fast and slow. Penguin Books.

5. Nunnally, J.C. (1978). Psychometric theory. New York: McGraw-Hill. 53(6), 1887–1934.

6. Parikh, P. (2009). Value Investing and Behavioral Finance. Tata McGraw-Hill

7. Schiffman,L.G.,& Kanuk,L.L.(1991). Prentice –Hall

8. Shefrin, H. (2000). Beyond greed and fear: Understanding behavioural finance and the psychology of investing. Oxford University Press.

9. Thaler, R. H., & Sunstein, C. R. (2008). Nudge: Improving decisions about health, wealth, and happiness. Yale University Press.

Journals

1. Aggarwal, M.S.,& Verma, H.L. (2014), Investors Perceptions on Trading Volume and Stock Return Volatility in Indian Stock Market. The IUP Journal of Applied Economics, 54 (4).

2. Agarwalla, S. K., Barua, S., Jacob, J., & Varma, J. R. (2012). A Survey of Financial Literacy among Students, Young Employees and the Retired in India. Citi Foundation, 31-32.

3. Ajzen. I, & Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behaviour, Englewood Cliffs, NJ:Prentice-Hall

4. Al-Ajmi, J.Y. (2008a). Risk tolerance of individual investors in an emerging market. International Research Journal of Finance and Economics, 17 (1), 15–26.

5. Al-Tamimi, Hussein A. Hassan and Al Anood Bin Kalli. 2009. Financial literacy and investment decisions of UAE investors. The Journal of Risk Finance Vol. 10 No. 5, 2009 pp. 500-516 q Emerald Group Publishing Limited 1526-5943. DOI 10.1108/1526594091100140

6. Albarracín, D.,& Wyer Jr, R.S. (2000). The cognitive impact of past behavior: influences on beliefs, attitudes, and future behavioral decisions. Journal of Personality and Social Psychology, 79 (1), 5–22.

7. Amaraveni P. & Archana M. (2017). A study of investor's behaviour towards various investment avenues in Warangal city. Asia Pacific Journal of Research in Business Management, 8(7), pp.32-48.

8. Amanda, B., Michael,G., & Ruiz-Menjivar. (2012). A Comparison of Three Measures of Risk Tolerance, Consumer Interests Annual, vol-58.

9. Asiamah, N., Mensah, H. K., & Oteng-Abayie, E. (2017). General, Target, and Accessible Population: Demystifying the Concepts forEffective Sampling.The Qualitative Report,22(6), 1607-1621. Retrieved fromhttp://nsuworks.nova.edu/tqr/vol22/iss6/9

10. Anbar, A.,& Eker, M. (2010). An empirical investigation for determining of the relation between personal financial risk tolerance and demographic characteristic. EGE Academic Review, 10 (2), 503-523.

11. Antonites, A.J.,& Wordsworth, R. (2009). Risk tolerance: A perspective on entrepreneurship education. Southern African Business Review, 13 (3), 69-85.

12. Apan, M. (2015). Determination of Factors Affecting Individual Investor Behaviours: A Study on Bankers. International Journal of Economics and Financial Issues, 5 (2), 531-543.

13. Arano, K., Parker, C. & Terry, R.L. (2010). Gender-based risk aversion and retirement asset allocation. Economic Inquiry, 48 (1), 147-155.

14. Arrow, K. (1986). Rationality of self and others, in: R. Hogarth and M. Reder, eds., Rational Choice (University of Chicago Press, Chicago), 201–215.

15. Bakeer, H.K. & Haslem, J.A. (1974). The Impact of Investor Socio-economic Characteristics on Risk and Return Preferences‖. Journal of Business Research, 2, 469-476

16. Baker, H., Kent., Hargrove., Michael., B. & Haslem, John A. (1977). An Empirical Analysis of the Risk-Return Preferences of Individual Investors, The Journal of Financial and Quantitative Analysis, 12 (3), 377-389.

17. Baker, T. L. (1994). Doing Social Research (2nd ed.). New York: McGraw-Hill Inc.

18. Bandgar, P.K. (1999). A Study of Middle Class Investors Preferences for Financial Instruments in Greater Bombay, Finance India, XIV (2), 574-576.

19. Bansal, D.A. (2015). An Analytical Study of Behavioural Finance in Investment Decisions. International Journal of Research in Finance and Marketing, 5 (4), 107-118.

20. Baker, T. L. (1994). Doing Social Research (2nd ed.). New York: McGraw-Hill Inc.

21. Barber, B. & Odean, T. (2001). Boys will be boys: gender, overconfidence, and common stock investment. The Quarterly Journal of Economics, 116 (1), 261–292.

22. Barberis, N. & Huang, M. (2001). Mental accounting, loss aversion and individual stock returns. Journal of Finance, 56, 1247−1292.

23. Barberis, N. & Thaler, R. (2003). A survey of behavioral finance. Handbook of the Economics of Finance. Amsterdam: North-Holland.

24. Barberis, N., Huang, M. & Santos, T. (2001). Prospect theory and asset prices. Quarterly Journal of Economics, 116, 1−53.

25. Barsky,R., Juster, F., Kimball,M., & Shapiro,M. (1997). Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study. The Quarterly Journal of Economics, 112(2), 537-579.

26. Bashir, D.T. (2013). Impact of Behavioral Biases on Investors Decision Making: Male Vs Female. Journal of Business and Management, 10 (3), 60-68.

27. Benartzi, S. & Thaler, R.H. (1999). Risk aversion or myopia: Choices in repeated gambles and retirement investments. Management Science, 45, 364–381.

28. Bernoulli, D. (1738/1954). Exposition of a new theory on the measurement of risk, translated by Louise Sommer. Econometrica, 22, 22–36

29. Belsky, G., Gilovich, T. (2000). Why Smart People Make Big Money Mistakes--and how to Correct Them: Lessons from the New Science of Behavioral Economics. United States: Simon & Schuster

30. Bhushan, P. & Medury, Y. (2013). Gender Differences in Investment Behaviour among Employees. Asian Journal of Research in Business Economics and Management, 3 (12), 147-157.

31. Binswanger, H.P. (1980). Attitudes toward risk: experimental measurement in rural India. American Journal of Agricultural Economics, 63, 395–407.

32. Blackstone, A.(2012), Principles of Sociological Inquiry – Qualitative and Quantitative Methods ISBN 13: 9781453328897 Publisher: Saylor Foundation

33. Blanco, C., Potenza, M. N., Kim, S. W., Ibáñez, A., Zaninelli, R., Saiz-Ruiz, J., et al. (2009). A pilot study of impulsivity and compulsivity in pathological gambling. Psychiatry Res. 167, 161–168. doi: 10.1016/j.psychres.2008.04.023

34. Bolton, G.E. (1991). A comparative model of bargaining: theory and evidence. American Economic Review, 81.

35. Bosnjak M, Tuten TL, Wittmann WW. (2005). Unit (non)response in web-based access panel surveys: An extended planned-behavior approach. Psychology and Marketing, 22, 489–505.

36. Bhushan, P., & Medury, Y. (2013). Financial literacy and its determinants. International Journal of Engineering, Business and Enterprise Applications, 4(2), 155-160.

37. Brown, H. D.2001. Principles of language learning and teaching. Englewood Cliffs, NJ: Prentice Hall.

38. Bryman, A. and Bell, E. (2004).Business Research Methods.Oxford University Press, Oxford

39. Chandra, A,. & Kumar, R. (2012). Factors Influencing Indian Individual Investor Behaviour: Survey Evidence, Decision, 39 (3), 24-31.

40. Charles, A., & Kasilingam, R. (2014). Do Investors' Emotions Determine their Investment Personality ?. Parikalpana - KIIT Journal of Management, 10 (II), 45-60.

41. Chaturvedi., M. & Khare, S. (2012). A Study of saving pattern and investment preferences of individualhousehold in India. International Journal Of Research in Commerce & Management, 3(5), 115-120.

42. Chaudhary., A.K. (2013). Impact of Behaviuoral Finance in Investment Decisions & Strategies. International Journal of Management Research & Business Strategy, 2 (2), 85-92.

43. Chen, G., Kim, K.A., Nofsinger., J.R. & Rui, O.M. (2007). Trading performance, disposition effect, overconfidence, representativeness bias, and experience of emerging market investors. Journal of Behavioral Decision Making, 20(4), 425–451.

44. Chen, Y.J., & Corter, J.E. (2006). When mixed options are preferred in multiple-trial decisions.

45. Chen, Z., & DeVaney, S.A. (2002). What factors affect the household net worth of employees and business owners? Financial Services Review, 11(4), 381-391.

46. Chen., Y.J., & Corter, J.E. (2010). Changes in risk preference over repeated decisions. Under editorial review.

47. Chia-Chi Chang., Sharon,A., Devaney., & Sophia,A (2004). Determinants of subjective and objective risk tolerance.

48. Chira, I., Adams, M., & Thornton, B. (2008). Behavioral bias within the decision making process. Journal of Business and Economic Research, 6(8), 11-20.

49. Cochran, W.G. (1963). Sampling Techniques, 2nd Ed., New York: John Wiley and Sons, Inc.

50. Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Lawrence Erlbaum Associates, Inc.

51. Collis, J. and Hussey, R. Business Research : A Practical Guide for Undergraduate and Postgraduate Students 3rd edition

52. Corter, J.E., & Chen, Y.J. (2006). Do investment risk tolerance attitudes predict portfolio risk? Journal of Business and Psychology, 20(3), 369-381

53. Cordell, D.M. (2001). "RISKPACK: How to Evaluate Risk Tolerance". Journal of Financial Planning, June, 36 – 40.

54. Creswell, J.K. (2003). Research design: Qualitative,Quantitative and Mixed –method approaches. Pub: Sage publications

55. Das, S.K. (2012). Middle class household's investment behaviour: An empirical Analysis. Journal of Radix International Educational and Research Consortium, 1(9)

56. Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor Psychology and Security Market under- and Overreactions. The Journal of Finance, 53(6), 1839-1885.

57. Dasgupta, S.C.R. (2015). Demographic And Socioeconomic Impact on Risk Attitudes of the Indian Investors – An Empirical Study. Asian Economic and Financial Revie, 5(4), 601-623.

58. Deshmukh & Joseph,S (2016). Behavioural finance: An introspection of investors psychology, Indian Journal of Commerce & Management Studies, VII(1).

59. Devi, C. (2012). A study on impact of socio–economic profile on investment pattern of salaried and business people in Coimbatore city. International Journal of Management & Information Technology, 2(1), 67-77.

60. Dillman, D.A. (2000) Mail and Internet Surveys: The Tailored Design Method. 2nd Edition, John Wiley and Sons, New York.

61. Dwyer, P.D., Gilkeson, J.H. & List, J.A. (2002). Evidence from mutual fund investors. Economic Letters, 76, 151- 158.

62. East, R. (2000). Complaining as Planned Behavior, Psychology & Marketing, volume 17, issue 12, p. 1077 – 1095,.

63. Elke U Weber., Ann-Renee Blais., & Nancy E. Betz (2002). A Domain-Specific Risk-Attitude Scale: Measuring Risk Perceptions and Risk Behaviors. Journal of Behavioral Decision Making, 15(4).

64. Ellsberg, D. (1961). Risk, ambiguity, and the Savage axioms. Quarterly Journal of Economics, 75(4), 643–669.

65. Embley, L. L. & Fox, J. J. (1997). Gender differences in the investment decision-making process. Financial Counseling and Planning, 8(2), 33-40.

66. Eysenck, S. B., & Zuckerman, M. (1978). The relationship between sensation-seeking and Eysenck's dimensions of personality. *British Journal of Psychology, 69*(4), 483–487

67. Fares, A. R. F., & Khamis, F. G. (2011). Individual investors' stock trading behavior at Amman Stock Exchange. International Journal of Economics and Finance, 3(6), 128 – 134.

68. Filbeck, G., Hatfield, P., & Horvath, P. (2005). Risk aversion and personality type. Journal of Behavioral Finance, 6(4), 170–180.

69. Finke, M.S., & Huston, S.J. (2003). The brighter side of financial risk: Financial risk tolerance and wealth. Journal of Family and Economic Issues, 24(3), 233- 256.

70. Fogel, O., & Berry, T. (2006). The disposition effect and individual investor decisions: the roles of regret and counterfactual alternatives. Journal of Behavioral Finance, 7(2), 107–116.

71. Fouraker, L., & Sidney, S. (1963). Bargaining Behavior. McGraw Hill, New York.

72. Funfgeld, B. and Wang, M.(2017) Attitudes and behaviour in everyday finance: Evidence from Switzerland, International Journal of Bank Marketing, volume 27, issue 2, p. 108 - 128

73. Fox, C.R., & Tvsersky, A. (1995). Ambiguity aversion and comparative ignorance. The Quarterly Journal of Economics, 110(3), 585-603.

74. Friedman, M., & Savage, L.J. (1948). The utility analysis of choices involving risk. Journal of Political Economy, 56, 279–304.

75. Friend, I., & Blume, M.E. (1975b). The demand of risky assets. American Economic Review, 65(5), 900-922.

76. Fromlet, H. (2001). Behavioral Finance—Theory and Practical Application. Business Economics, 36(3).

77. Gandhi, K.(2015), Investment preferences of investors – A survey of Chennai. International Journal of Multidisciplinary Research and Modern Education (IJMRME), I(I).

78. Gary Belsky., & Thomas Gilovich (1999). Why Smart People Make Big Money Mistakes and How To Correct Them. Lessons From The New Science Of Behavioral Economics.

79. Genesove, D., & Mayer, C. (2001). Loss aversion and seller behavior: evidence from the housing market.

80. George, M., Frankfurter, A., & Elton G McGoun, (2002). Resistance is futile: the assimilation of behavioral finance. Journal of Economic Behavior & Organization, 48(2002), 375–389.

81. Ghazali, E.,& Othman, M. (2003). Demographic and psychographic profile of active and passive investors ofklse: A discriminant analysis. Asia Pacific ManagementReview, 9(3), 391-413.

82. Gill., David., & Prowse, (2012). A structural analysis of disappointment aversion in a real effort competition. American Economic Review, 102 (1), 469–503.

83. Giridhari, M., & Debasish, S. (2011). A study on investment perception among urban investors in orissa. Journal of Management thought and practices, 3(1), 1.

84. Glaser, B. G., & Strauss, A. (1967). *The discovery of grounded theory. Strategies for qualitative research*. Chicago: Aldine.

85. Gneezy, U., & Potters, J. (1997). An experiment on risk taking and evaluation periods. The Quarterly Journal of Economics, 112, 631–645.

86. Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*(6), 504–528.

87. Gopalakrishnan, A. (2012). Mental accounting in investment decisions. Published on April 07, 2012, The Business line.

88. Gopi, M., & Ramayah, T.(2007). Applicability of theory of planned behavior in predicting intention to trade online Some evidence from a developing country. International Journal of Emerging Markets. Emerald Group Publishing Limited, 2(4), 348-360.

89. Gour, Y. (2013). Retail investor‘s behavior towards securities: A case study of Rohtak city. Asian Journal of Business and Economics, 3(3.1).

90. Grable, J.E. (2000). Financial risk tolerance and additional factors that affect risk taking in everyday money matters. Journal of Business and Psychology, 14, 625–630.

91. Grable, J.E., & Lytton, R.H. (1998). Investor risk tolerance: testing the efficacy of demographics as differentiating and classifying factors. Financial Counseling and Planning, 9(1), 61-73.

92. Grable, J.E., & Lytton, R.H. (1999). Financial risk tolerance revisited: The development of a risk assessment instrument. Financial Services Review, 8(1), 163-181.

93. Gilovich, T., Griffin, D., & Kahneman, D. (Eds.). (2002). Heuristics and biases: The psychology of intuitive judgment. Cambridge University Press. https://doi.org/10.1017/CBO9780511808098

94. Hallahan, T.A., Faff, R.W., & McKenzie, M.D. (2004). An empirical investigation of personal financial risk tolerance. Financial Services Review, 13, 57–78.

95. Hanna, S., & Chen, P. (1997). Subjective and objective risk tolerance: Implication for optimal portfolios. Financial Counseling and Planning, 8(2), 17-26.

96. Hanna, S.D., Gutter, M.S. ,& Fan, J.X. (2001). A measure of risk tolerance based on economic theory. Financial Counseling and Planning, 12(2), 53-60.

97. Harikanth, D., & Pragathi, B. (2012). Role Of Behavioural Finance In Investment Decision Making- A Study on Select Districts of Andhra Pradesh, India. International Journal in Multidisciplinary and Academic Research (SSIJMAR),

98. Haselton, M.G., Nettle, D., & Andrews, P.W. (2005). The evolution of cognitive bias(PDF). The Handbook of Evolutionary Psychology: Hoboken, NJ, US: John Wiley & Sons Inc., 724–746.

99. Hon-Snir, S., Kudryavtsev A. & Cohen G. (2012). Stock Market Investors: Who Is More Rational and Who Relies on Intuition? International Journal of Economics and Finance, 4(5), 56-72.

100. Horvath, P., & Zuckerman, M. (1993). Sensation seeking, risk appraisal, and risky behavior. Personality and Individual Differences, 14, 41–52.

101. Hsee, C.K., & Weber, E.U. (1999). Cross-national differences in risk preference and lay predictions. Journal of Behavioral Decision Making.

102. Hussey,J. and Hussey,R. (1997). Business Research: A practical Guide for Undergraduate and Post graduate Students. Macmillan, London

103. Hvide, H.K. (2002). Pragmatic beliefs and overconfidence. Journal of Economic Behavior & Organization. 48(1), 15–28.

104. Inga Chira, M.A. (2008). Behavioral Bias within the Decision Making Process. Journal of Business & Economics Research, 6 (8), 11-20.

105. Israel,G.D. Determining Sample Size, PEOD 6, one of a series of the Agricultural Education and Communication Department, University of Florida Extension. Published November 1992. Revised April 2009. Reviewed June 2013

106. Iyer, S.B., & Bhaskar, K.R. (2002), Investor's psychology: A study of investor behaviour in the Indian capital market, Finance India, 16(4), 1357-1375.

107. Jackson, D.N., Hourany, L., & Vidmar, N.J. (1972). A four-dimensional interpretation of risk taking. Journal of Personality, 40(3), 483–501.

108. Jaiswal, B., & Kamil, N. (2012), Gender, Behavioral Finance and the Investment Decision‖, Business Review, 7(2), 8-22.

109. Jermakova, K. (2012). The Impact of Individuals' Financial Behaviour on Investment Decisions. Economy and Business Economics, 242-250.

110. Josephs.R.A., Larrick. R.P., Steele. C..M,. and Nisbett. R.E. (1992) "Protecting the self from the negative consequences of risky decisions," Journal Personality and Social Psychology, 62(1), 26-37.

111. Kabra, G., Mishra, P.K., and Dash, M.K. (2010). Factors Influencing Investment Decision of Generations in India: An Econometric Study. Asian Journal of Management Research, 4(2), 305-326 .

112. Kathuria, L.M, and Singhania, K. " Investment Decision Making: A Gender-Based Study of Private Sector Bank Employees" , The IUP Journal of Behavioral Finance, Vol. IX, No. 1, 2012, Pg 45.

113. Kahneman, D., & Lovallo, D. 1993. Timid choices and bold forecasts: A cognitive perspective on risk taking. Management Science, 39: 17-31.

114. Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgment of representativeness (PDF). Cognitive Psychology, 3 (3), 430–454.

115. Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. Econometrica, 47, 263–291.

116. Kahneman, D., & Tversky, A. (1979). Prospect theory: an analysis of decision under risk. Econometrica, 47, 263–291.

117. Kahneman, D., Jack L. Knetsch., & Richard H. Thaler (1991). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. The Journal of Economic Perspectives, 5(1), 193-206

118. Kahneman, D., Knetsch, J.,& Thaler, R. (1986). Fairness as a constraint on profit seeking: entitlements in the market. American Economic Review, 76, 728–741.

119. Kahneman, D., Slovic, P., and Tversky, A. eds., Judgment Under Uncertainty: Heuristics and Biases (Cambridge University Press, Cambridge), 294–305.

120. Kannadhasan, M. (2006). Risk appetite and attitudes of retail investors with special reference to capital market. Management Accountant, 41(6), 448.

121. Kogan, N.,& Wallach, M.A. (1964). Risk taking: A study in cognition and personality. NewYork: Holt, Rinehart and Winston.

122. Kulkarni, M. S. (2014), A Study of Investment Behaviour Based On Demographics, Journal of Commerce and Scientific Research, 3(4), 47-54.

123. Kumar, A. (2008), Retail Investor Sentiment and Return Comovements, The Journal of Finance, 51(2): 2451–2486.

124. Kumar, R., and Dhankar, R.S. (2010), Distribution of Risk and Return: A Test of Normality in Indian Stock Market, South Asian Journal of Management, 18(1).

125. Kumar, S. and Goyal. , N. (2015). Behavioural biases in investment decision making—A systematic literature review.QualitativeResearch in Financial Markets7: 88–108

.

126. Korb, S. (2010). Mothering fundamentalism: The transformation of modern women into fundamentalists. International Journal of Transpersonal Studies, 29(2), 68–86.. *International Journal of Transpersonal Studies, 29* (2). http://dx.doi.org/10.24972/ijts.2010.29.2.68

127. Lopes, L. (1991). The rhetoric of irrationality. Psychology and Theory, 1, 65–82.

128. Loomes, G. Sugden, R. (1982). "Regret theory: An alternative theory of rational choice under uncertainty". Economic Journal. 92(4): 805–824. doi:10.2307/2232669. JSTOR 2232669.

129. Maccrimmon,K.R., & Wehrung,D.A. (1995). Determinants of Risky Decision-Making Behavior: A Test of the Mediating Role of Risk Perceptions and Propensity. The Academy of Management Journal, 38(6), 1573-1592

130. Marchand, M. (2012). Behavioral biases in financial decision making, Bachelor Theses Finance, 8200, 1-28.

131. Markowitz, H. (1952). The utility of wealth. Journal of Political Economy, 60, 151–158.

132. Maruthupandian, P. (2001), A Study On Equity Investor‘s Awareness‖ unpublished thesis, Bharathiyar University, Tamilnadu.

133. Marshall MN. Sampling for qualitative research. Fam Pract. 1996 Dec;13(6):522-5. doi: 10.1093/fampra/13.6.522. PMID: 9023528.

134. Massimo, M., & Andrei, S. (2005), Behavioral Biases and Investment. Review of Finance, 9(4), 483-507.

135. Maxime Merli ., & Tristan Roger (2017). What Drives the Herding Behavior of Individual Investors? Finance, 34(3), 2013 41.

136. Mazzarello, P. (2000). What dreams may come? Nature 408, 523. 150 V.L. Smith / The Journal of Socio-Economics, 34 (2005), 135–150.

137. Morse, W.C. (1998). Risk taking in personal investments. Journal of Business and Psychology, 13, 281–288.

138. Mukerjee et al. (2017). Judgment and Decision Making, 12(1), 81-89.

139. Mullainathan, S., & Thaler, R. (2001). Behavioral economics. In: International Encyclopedia of the Social and Behavioral Sciences. Pergamon, Oxford.

140. Mustapha, C. & Imed, M, 2014. "Behavioral Finance: An Empirical Study of the Tunisian Stock Market," International Journal of Economics and Financial Issues, Econjournals, vol. 4(3), pages 527-538.

141. Nagy, R.A., & Obenberger, R.W. (1994). Factors Influencing Individual Investor Behavior. Financial Analysts Journal, 50(4), 63-68.

142. Nair, R., & Antony, A. (2013). Evolutions and Challenges of Behavioral Finance, International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 Index Copernicus Value.

143. Narayana, D.L. (1976). Income, Saving and Investment of Household Sector in Chittor District‖, S.Chand & Co. Ltd., New Delhi, 1-187.

144. Nayak, S., & Sethi, N. (2013). Determinants and Pattern of Saving Behaviour in Rural Households of Western Odisha, Department of Humanities and Social Sciences, National Institute of Technology, Rourkela – 769008 ,Odisha, India.

145. Neelakantan, U. (2010). Estimation and impact of gender differences in risk tolerance. Economic Inquiry, 48(1), 228–233.

146. Nevins, D. (2003). Goals-based Investing: Integrating Traditional and Behavioral Finance. SEI Wealth

147. Nicholson, Nigel & Fenton-O'Creevy, Mark & Soane, Emma & Willman, Paul. (2001). Risk Propensity and Personality. Social Research. 8.

148. Nunnally, J.C. (1978). Psychometric theory. New York: McGraw-Hill. 53(6), 1887–1934.

149. Odean, T. (1999). Do investors trade too much? American Economic Review, 89(5), 1279–1298.

150. Olsen, R. (1998). Behavioral Finance and Its Implications for Stock-Price Volatility. Investment Management and Research, Financial Analysis Journal, 54(2), 10–18.

151. Olsen, R. A. (1998). Behavioral Finance and Its Implications for Stock-Price Volatility. Financial Analysts Journal, 54(2), 10-18.

152. Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: the multiple processes by which past behavior predicts future behavior. Psychological Bulletin, 124: 54–74.

153. Palanivelu. V. R. and Chandrakumar. K, 'A Study on Preferred Investment Avenues among Salaried People with Reference to Namakkal Taluk, Tamil Nadu, India', International Conference on Business Economics and Accounting, Bangkok Thailand, 20-23 March, 2013.

154. Pandit, A., & Yeoh, K. (2014), Psychological Tendencies In An Emerging Capital Market: A Study Of Individual Investors In India, The Journal of Developing Areas, 48(3).

155. Plous, S. (1993). The Psychology of Judgment and Decision Making, p. 233. New York : McGraw-Hill, ©1993.

156. Pompian, M. (2006). Behavioral Finance and Wealth Management. Wiley Finance, 66–67.

157. Porter, E..J. (1999). Defining the Eligible, Accessible Population for a Phenomenological Study. Western Journal of Nursing Research. 1999;21(6):796-804. doi:10.1177/01939459922044207

158. Prasad, J.M. (2004) Impact of Investor's Behavioral Biases on the Indian Equity Market and Implications on Stock Selection Decisions: An Empirical Analysis.

159. Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behavior Research Methods, Instruments, & Computers, 36, 717-731.

160. Rabin, M. (2002). Inference by believers in the law of small numbers. Quarterly Journal of Economics, 117(3), 775−816.

161. Ramesh, N.G.M. (2012). A study on relevance of demographic factors in investment decisions. International Journal of Financial Management, 1(1).

162. Rao, P.V.D., Chalam, G.V., & Murty, T.N. (2013). Demographic variables influencing in the retail investors' investment – a scientific analyses. International Monthly Refereed Journal of Research In Management & Technology, 131(II).

163. Rastogi S (2015) Differences in Behavioural Biases in Investment Decision Making: Gender and Occupation Perspective. Journal of International Business and Economy 16: 13-35. JIBC Jan 2017, Vol. 22, No.S7 - 12

164. Ray, K.K. (2009). Investment Behavior and the Indian Stock Market Crash 2008:An Empirical Study Of Student Investors. The IUP Journal of Behavioral Finance, VI(3&4).

165. Rajkumar, A.. (2002). Public Spending And Outcomes: Does Governance Matter?. Journal of Development Economics. 86. 96-111. 10.1016/j.jdeveco.2007.08.003.

166. Reddy, S.N., & Reddy, V.H. (2009). A study on investors behaviour towards mutual fund products, TIET & TIME Research & Consultancy Division, TIRUPATI – 517 501,

167. Regina, P.A. L. (2010). A Study on the Individual Investor Behaviour in Capital Market with Special Reference to Tamilnadu. Ph. D. Thesis of Bharathidasan University.

168. Riccardo, B. (2015). Behavioral Computational Social Science, John Wiley & Sons, Ltd

169. Ritter, J.R. (2003). Behavioral Finance. Pacific-Basin Finance Journal, 11(4), 429–437.

170. Rizvi, S. & Fatima, A. (2015).Behavioral Finance: A Study of Correlation Between Personality Traits with the Investment Patterns in the Stock Market, Managing in Recovering Markets, p. 143 - 155

171. Robson, C. (2002). Real World Research: A Resource for Social Scientists and Practitioner-Researchers (2nd ed.). Oxford: Blackwell Publishers Ltd.

172. Roopadarshini, S. (2014). A Study on Implication of Behavioral Finance towards Investment Decision Making on Stock Market. Asia Pacific Journal of Management & Entrepreneurship Research (APJMER), 3(1).

173. Rustichini, Aldo & Deyoung, Colin & Anderson, Jon & Burks, Stephen. (2016). Toward the Integration of Personality Theory and Decision Theory in Explaining Economic Behavior: An Experimental Investigation. Journal of Behavioral and Experimental Economics. 64. 10.1016/j.socec.2016.04.019.

174. Sahi, S.K. and Arora, A.P. (2012), "Individual investor biases: a segmentation analysis", Science, Vol. 185 No. 4157, pp. 1124-31.

175. Saucier., & Gerard (2000). Isms and the Structure of Social Attitudes. Journal of Personality and Social Psychology, 78(2), 366-85.

176. Saunders, M., Lewis, P. and Thornhill, A. (2009) Research Methods for Business Students. Pearson, New York.

177. Sehgal, S., Sood, G.S. & Rajput, N. (2009). Investor Sentiment in India: A Survey, VISION—The Journal of Business Perspective, 13(2l).

178. Sekaran, U. (2003) Research Methods for Business: A Skill-Building Approach. 4th Edition, John Wiley & Sons, New York.

179. Shafi, H. (2011). Relationship between Risk Perception and Employed Investment Behavior‖. Journal of Economics and Behavioral Studies, 3(6), 345-355.

180. Shaikh, A. R. H., & Kalkundrikar, A. B. (2011b). Impact on demographic factors on retail investors' investment decisions - An exploratory study. Indian Journal of Finance, 5 (9), 35-44.

181. Sharma,A.J. (2016). Role of Behavioural Finance in the Financial Market. International Journal of Business and Management Invention, 5 (1), 01-05.

182. Shaw, K.L.(1996). An Empirical Analysis of Risk Aversion and Income Growth. Journal of Labor Economics,14, 626-653.

183. Shefrin, H., & Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence. Journal of Finance, 40(3), 777-790.

184. Shefrin, H.M., & Thaler, R.H. (1988). The behavioral life-cycle hypothesis. Economic Inquiry, 26(4), 609-643.

185. Shiller, R. J. (1999). Human behavior and the efficiency of the financial system. Handbook of Macroeconomics, 1, 1305-1340.

186. Shiller, R. J. (2000). Irrational exuberance. Princeton, New Jersey, Princeon University.

187. Shiller, R. J. (2003). Efficient Markets Theory to Behavioral Finance. The Journal of Economic Perspectives, 17(1), 83-104.

188. Shiller, R.J. (2003). From efficient markets theory to behavioral finance. The Journal of Economic Perspectives, 17(1), 83-104.

189. Shleifer, A. (2000). Inefficient markets: an introduction to behavioral finance. Oxford University Press. Oxford.

190. Sikidar, S., & Singh, A.P. (1996), Financial services: Investment in equity and Mutual funds-A behavioral study‖, in Bhatia B.S., and Batra G.S.(ed.)

Management of financial services, deep and deep publications, New Delhi, 136-145.

191. Sindhu, K., & Rajitha Kumar, S. (2014). Influence of Risk Perception of Investors on Investment Decisions: An Empirical Analysis. Journal of Finance and Bank Management, 2(2), 15-25.

192. Sindhu, K.P., & Kumar, S.R. (2014). Influence of Risk Perception of Investors on Investment Decisions: An Empirical Analysis. Journal of Finance and Bank Management, 2(2), 15-25.

193. Sireesha, P.B., &Sreelaxm, C. (2013), Impact of Demographics on Select Investment Avenues: A Case Study of Twin Cities of Hyderabad and Secunderabad, India.

194. Sitlani, M., Sharma, G., and Sitlani, B. (2011), The IUP Journal of Behavioral Finance. Investment choice of occupants of financial services industry, 8(1), 29-39.

195. Slovic, P. (1964). Assessment of risk taking behavior. Psychological Bulletin, 61(3), 220–233.

196. Sobel, Michael E. (1982). "Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models". Sociological Methodology. 13: 290–312. CiteSeerX 10.1.1.452.5935. doi:10.2307/270723. JSTOR 270723.

197. Sreedevi, V. R and Chitra, K.,. (2011). Does personality traits influence the choice of investment? IUP Journal of Behavioral Finance, 8(2), 47–57.

198. Sultana, S.T. (2010). An empirical study of Indian individual investors‘behavior. Global Journal of Finance and Management, 2(1), 19–33.

199. Sultana, S.T., & Pardhasaradhi, S. (2011). An Empirical Investigation of the Relation between Risk Tolerance and Socioeconomic Characteristics of Individual Investors, Advances In Management, Advances in Management, 4(10).

200. Sulaiman, E.K. (2012). An Empirical Analysis of Financial Risk Tolerance and Demographic Features of Individual Investors, Procedia Economics and Finance, Volume 2, 2012, Pages 109-115

201. Suman., & Warne, D.P. (2012). Investment Behaviour of Individual Investor in Stock Market, 2(2).

202. Sung, J., & Hanna, S. (1996). Factors Related to Risk Tolerance, Financial Counseling and Planning, 7, 11-20.

203. Suits, D.(1957). Use of dummy variables in regression equations. Journal of the American Statistical Association, 52(280), 548-551. doi: 10.23.07/2281705

204. Sybil, B.G., & Eysenck, H.J. (1978). Institute of Psychiatry, University of London. 43(3), 1247-1255.

205. Tabassum, S. (2010) An Empirical Study of Indian Individual Investors' Behavior, Global Journal of Finance and Management, p. 19 - 33

206. Thaler, R. (1980). Toward a positive theory of consumer choice. Journal of Economic Behavior & Organization, 1(1), 39-60.

207. Thaler, R., Tversky, A., Kahneman, D.,& Schwartz, A. (1997). The effect of myopia and loss aversion on risk taking: An experimental test. Quarterly Journal of Economics, 112, 647–660.

208. Thaler, R.H., & Shefrin, H.M. (1981). An Economic Theory of Self-Control. Journal of Political Economy, 89(2), 392-406.

209. Thimmarayappa, R. (2015). Impact of Behavioural biases in Portfolio Investment Decision Making Process. International Journal of Commerce, Business and Management, 4 (4), 1278-1289.

210. Tversky, A. &Kahneman. (1979). Prospect theory: an analysis of decision under risk. Econometrica, 47 (2), 263-292.

211. Tversky, A., & Kahneman, D. (1973). Availability: A Heuristic for Judging Frequency and Probability, Cognitive Psychology, 5(2): 207–232.

212. Tversky, A., & Kahneman, D. (1987). Rational choice and the framing of decisions. In: Hogarth, R.M., Reder, M.W.(Eds.), Rational Choice. University of Chicago Press, Chicago.

213. Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. Science, 211 (4481), 453-458.

214. Viechtbauer, W., Smits, L., Kotz, D., Budé, L., Spigt, M., Serroyen, J., & Crutzen, R. (2015). A simple formula for the calculation of sample size in pilot studies. Journal of clinical epidemiology, 68(11), 1375–1379. https://doi.org/10.1016/j.jclinepi.2015.04.014

215. Wallach, M.A., Kogan, N., & Bem, D.J. (1964). Diffusion of responsibility and level of risk taking in groups. The Journal of Abnormal and Social Psychology, 68(3), 263–274.

216. Weber, E.U., & Hsee, C.K. (1998). Cross-cultural differences in risk perception, but cross cultural similarities in attitudes towards perceived risk. Management Science.

217. Weber, E.U., & Milliman, R. (1997). Perceived risk attitudes: Relating risk perception to risky choice. Management Science, 43, 122–143.

218. Weber, E.U., Blais, A.R., & Betz, N.E. (2002). A domain-specific risk-attitude scale:Measuring risk perceptions and risk behaviors. Journal of Behavioral Decision Making, 15, 263–290.

219. Wilson,T.D., Houston, C.E., & Kathryn, M. (1996). Etling University of Virginia, A New Look at Anchoring Effects: Basic Anchoring and Its Antecedents, Journal of Experimental Psychology: General, 125(4), 387-402.

220. Wong, A., & Carducci, B.J. (1991). Sensation seeking and financial risk seeking in everyday money matters. Journal of Business and Psychology, 5, 525–530.

221. Wong, A., & Carducci, B.J. (1991). Sensation seeking and financial risk taking in everyday money matters. J Bus Psychol., 5, 525–530.

222. Worthington, A.C. (2006). Debt as a source of financial stress in Australian households, International Journal of Consumer Studies, 30, 2-15.

223. Yao, R., Sharpe, D.L., & Wang, F. (2011). Decomposing the age effect on risk tolerance. The Journal of Socio-Economics, 40(6), 879–887.

224. Yook, K.C., & Everett, R. (2003). Assessing risk tolerance: Questioning the questionnaire method. Journal of Financial Planning, 48–55.

225. Zeelenberg, M. (1999a). Anticipated regret, expected feedback and behavioral decision-making. Journal of Behavioral Decision Making, 12, 93–106.

226. Zikmund, W.G. (2003). Business Research Methods. Thomson/South-western

227. Zuckerman, M., (1983). Sensation seeking and sports. Personality and Individual Differences, 4, 285–292.

Websites:

1. Crouch, M. and McKenzie, H. (2006). The Logic of Small Samples in Interview-Based Qualitative Research. Social Science Information, 45, 18. https://doi.org/10.1177/0539018406069584 Retrieved October 5, 2017

2. Damodaran, Duality of risk, http://pages.stern.nyu.edu/~adamodar/ New_Home_Page/risk/riskaversion.html. Retrieved July 10, 2016

3. Shefrin, H. (2010). How psychological pitfalls generated the global financial crisis. Working paper, available at http://papers.ssrn.com/sol3/papers.cfm?. Retreived December 14, 2019

4. Preacher, K.J. Calculation for the Sobel test: An interactive calculation tool for mediation tests. http://quantpsy.org/sobel/sobel.htm. Retrieved March 15, 2018

APPENDICES

APPENDIX - A

Questionnaire for Investors

Dear Participant,

This questionnaire is a part of the research conducted on the relationship between the Risk profile and Investor behavior in Chennai. This study is purely for academic purpose and your details will be strictly kept confidential Thank for your co-operation

Name			**Email Id**		
Occupation			**Mob. No**		
Age	<30	30-40	40-50	50-60	>60
Gender	Male	Female	Others		

Gender	Male	Female	Others		
Income(Annum)	<3 Lakhs	3-5 Lakhs	5-10 Lakhs	10-20 Lakhs	>20 Lakhs
Monthly Expense	<20000	20000-40000	40000-60000	60000-80000	>1 lakh
Investments as a % of Income	<20%	20-40%	40%-60%	60-80%	80-100%

What best describes your Investment experience (Please tick)

Beginner	Moderate
Knowledgeable	Experienced

What is your most preferred investment option (Please rank them from 1-6 in order, 1 being the most preferred option and 6 the least preferred)

Fixed Deposits	**Gold**	**Share Market**
Provident Fund	**Property**	**Insurance policies**

What is the purpose of your investments (Please rank them from 1-6 in order, 1 being the most preferred option and 6 the least preferred)

Children's future(Education/marriage)	**Retirement**
Purchase of Assets(house/car)	**Vacation Abroad**
Emergencies	**Charities**

What are the sources for your info/advice on investments (Please rank them from 1-6 in order, 1 being the most preferred source and 6 the least preferred)

Newspaper/Magazines	TV News Channels
Financial websites/ blogs	Social media
Friends & family	Financial advisors

Part 1 (Risk tolerance section)

This section helps to measure your willingness to take risk in hypothetical situations

Please tick your choice for the statements from the given five options,

Strongly Agree **(Risk seeker)**	Agree **(Moderate risk seeker)**	Neutral	Disagree **(moderate risk averse)**	Strongly Disagree **(Risk averse)**

1. How would you `honestly' describe yourself as a risk-taker? I am a risk taker

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

2. If you had to choose between two jobs, which would be like to pick?

A. One that has a huge fixed component and a small variable component linked to performance (less risk)

B. One that has a small fixed component but a large variable component linked to performance (risky)

Definitely A	Likely A	Not clear	Likely B	Definitely B

3. During the regular visit to the Departmental store, the sales person recommends a product which you buy. It turns out to be bad. On your next visit, the sales person says that the last batch was bad and the new one is good. You will take the risk and buy

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

4. On your regular visit to the restaurant, the waiter says the chef has cooked something new and wants you to try the new dish. You will take the risk and order the new dish

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

5. While filing your income tax returns you find out that by concealing certain income you can save some tax, you will go ahead in concealing it even though there is a risk that you might be exposed

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

6. You investment goes down by 10%, your response

1. I will invest the same amount at a lower price to average my purchase cost
2. No problem. I have done enough research, so won't bother on the drop
3. No clear Idea, I will consult others for advice

4. I will hold on till price comes to the cost price and then sell

5. I will book my losses and exit. Maybe invest elsewhere

7. On an investment portfolio of 1 lakh, if due to market conditions, your portfolio falls to Rs. 85,000 within a month, would you

1. Do not intend to take risks. Sell all of the investments.

2. Intend to take more risk. Invest more funds to lower your average investment price.

3. Sell a portion of your portfolio to cut your losses and reinvest into more secure investment sectors

4. Hold the investment and sell nothing, expecting performance to improve.

5. Wait for my portfolio to come to 1 Lakh and then sell the entire portfolio

8. You are on a TV game show and can choose one of the following. Which option would you take considering the given risks?

1. 10,000 in cash(Risk free)

2. A 75% chance of winning 25,000 (less risk free)

3. A 50% chance at winning 50,000 (moderate risk)

4. A 30 % chance at winning 1,00,000 (Risky)

5. A 5% chance at winning 10,00,000 (Very Risky)

9. You have saved of 10% of your gross annual salary and an investment opportunity is presented. You have a 50/50 chance that the value of your investment will triple over the next three years or that you will lose the entire amount invested. What will you do?

1. Will automatically refuse the proposal.

2. Will carefully examine the proposal and then refuse.

3. Will have difficulty making a decision.

4. Will carefully examine the proposal and then accept.

5. Will automatically accept the proposal.

10. On a Holiday you visit a casino as part of your tour and you happen to win a sizable amount. Your next option will be

1. Bet again with entire amount (both winnings and your initial amount)

2. Bet again with the entire winning but setting aside the initial amount

3. Bet again with 50% of both the winnings and initial money

4. Keep the winnings safe and betting with the initial amount

5. Quit the game keeping safe both the winnings and the initial

Part 2 (Investment decision section)

This section contains hypothetical Investment decision situations. Please choose any one based on your preference

1. Which of these investment options are you likely to take?

1. The returns should be good at the same time my capital should be safe

2. The returns need not be phenomenal but above average.

3. There should be a possibility of earning high returns. Don't mind fluctuations

4. The returns should be very good in the long term with less fluctuation

5. There should be no fear of losing money with moderate returns

2. Before making an important financial decision, you

1. Both loss and gain

2. Always consider the possible loss

3. Always consider the possible gain

4. Usually consider the possible gain

5. Usually consider the possible loss

3. Tax savings investments means taking on more risk. Which of the following statements best describes your goal for investing?

1. Guaranteed returns, no tax savings

2. Stable returns, minimal tax savings

3. Some variability in returns, some tax savings

4. Moderate returns, reasonable tax savings

5. Unstable higher returns, maximum tax savings

4. What is your primary aim when making an investment?

1. Securing my money

2. Earning high returns

3. Achieve a life stage goal like retirement, children's future etc.,

4. I just invest for the sake of investing

5. Creating a regular stream of income

5. Investments tend to give high returns with high risks, what kind of investments are you likely to make?

1. Concentrate on capital preservation

2. Take extra risk and earn high returns quickly

3. Keep half of it safe and take risk with the remaining half

4. Keep a little amount safe and take risk with more money

5. Keep most of the money safe and take risk with a little amount to earn extra returns

Part 3 (Behaviour Bias section)

This section aims to understand the biases associated with your behaviour for the given Investment choices. Please use the appropriate score to rank your choice from the scale below

Extremely Unlikely	Unlikely	Neutral	likely	Extremely likely
1	2	3	4	5

	Behaviour choices	**Score**
1	You have an investment in your portfolio whose value is going down daily. You will sell the investment to avoid loss	
2	You would rather not lose Rs.1000 than earn Rs.3000	
3	When you purchase an investment and it happens to be a winning one, you feel that it is purely because of my knowledge and actions	
4	My past profitable investments were mainly due to my specific investment skills	
5	You care about saving for the future more than spending on your daily obligations	
6	You divide your money into, money for investment and money for daily spending	
7	You tend to stick to what you have rather than exploring the unknown	
8	You tend to stick to tested and tried investments like Gold and Properties rather than explore new investment avenues	
9	You always predict the likelihood of an event occurring based on how frequently it is covered in the medial and social network	
10	You tend to make investments based on tips from news channels and magazines rather than understanding them	

11	You tend to treat each element (**Bank FDs, gold, real estate, stocks etc**.) of your investment portfolio separately	
12	You don‘t care about the performance of your investment portfolio as a whole but you care about the return of each asset separately	
13	You always consult others before making an Investment decision	
14	Other investors' decisions have an impact on you investment decisions	
15	You have been thinking on investing in a particular stock and you find out that your friends are investing in the same high return stock. You will definitely invest in it	
16	You had the option of choosing from an Indian company and American company. You decide to invest in the American company. Now you find out from the news that there are high returns from both the company. You will still continue with your earlier decision	
17	You had invested your money in gold for your wife and children. It holds a lot of sentimental value to you. Even during hard times when you are left with no other option, you will not sell the gold to take care of your commitments	
18	You bought a piece of property on the outskirts for investment purpose. Your agent tells you that the market price is going down and you can still make money from the deal if you sell it now. You will not sell the property	
19	You are planning to invest in stocks and the first stock you identify is priced at Rs.1000 per share and the second one and the third one is below Rs.1000 per share. You feel that the first one is expensive	
20	You want to buy IT stocks. The first one you see is Rs.100 per share and the second one is priced at Rs.75. You feel that the second one is cheap	

Thank you for your valuable time

APPENDIX-B

Focused Group Discussion Format for designing the questionnaire for risk profiling investors

Focus Group Introduction

Welcome:

Let me extend my heartfelt gratitude for attending this discussion to frame the questionnaire to identify the investors risk taking ability and behaviour bias.

Moderator (The Researcher: Samuel E Chakkaravarthy)

Purpose of Focus Group:

I am doing a research study on the risk profile of investors in Chennai and its impact on their investment behaviour. I am here as the moderator to conduct the focus group discussion (FGD) to get some information on how to frame the questionnaire to find out the risk tolerance and behaviour bias of the investors in Chennai For your kind information, there are three categories of investors. Please let me know as how to classify the investors in separate clusters so that it will be easy to identify the risk capacity they have which could be subsequently mapped to their investment decisions. Each participant will be given ten minutes to express their views and no debate or cross talk is encouraged. At the end the moderator will summarise the session with your concurrence.

FGD views documentation

Focus Group Discussion

No: of FGD conducted	2
No: of participants	10 in each group
Duration of FGD	1 hour
Languages used in FGD	Tamil and English
Profile ofparticipants	8 mutual fund advisors
	3 Fixed deposit agents
	5 Realtors dealing with both residential and plots
	4 Insurance advisers
Years of experience of participants	> 10 years
Mode of interview	Face to face

Objective of the Focussed group discussion

- How to identifythe risk profile of the respondents and classify them
- Understanding the various biases affecting investment decision
- Classifying the respondent according to their investment choices

Outcome of the FGD.

1) Ten risk questions to be framed across the different domains (finance, social, ethical,). This final list of questions were got after testing 20 questions across the domains(finance, health, social, general)

2) Equal weightage to be given to all the questions hence no ranking system need to be followed. This style was of risk profiling was chosen from DOSPERT scale, Finametrica, Survey of consumer finances.

3) A 5 point Likert scale to be used to find the risk score,1 being no risk and 5 being risky.

4) Twenty bias questions to be framed, ten for cognitive bias and ten for emotional bias The final list of bias statements was got after testing the biases with the respondents. The biases were chosen from the literature survey done

5) 5 point Likert scale for identifying biasness with 0 being no bias and 5 being biased

6) Five hypothetical investment questions to be framed to identify the Investor behaviour. The choices were chosen from the literature survey done

7) A 5 point Likert scale to be used to find the Investor behaviour score, 1 being no risk taker and 5 being risk taker.

APPENDIX C

PUBLICATIONS AND PRESENTATIONS BY THE SCHOLAR IN THE RESEARCH AREA

List of Publications

1) Samuel E Chakkaravarthy, "Attitude towards Risk in Investment vis-à-vis State of Wealth of an Individual - A Study on Behavioural Bias in Investment", IUJ Journal of Management IUJ Journal of Management Vol. 3, No.1, May 2015 Vol. 3 No. 1 , ISSN : 2347 – 5080, May 2015

2) Samuel E Chakkaravarthy, Goutam Tanty et.al, "A study on the financial risk profile of investors in Chennai" Elementary Education Online,Vol.20,Issue 5, ISSN:1305-3515, February 2021,

3) Samuel E Chakkaravarthy, Goutam Tanty et.al "A study on the financial literacy level of investors in Chennai", published in the Souvenir of Indian institute of production management, 15th February 2020

4) Samuel E Chakkaravarthy, Goutam Tanty et.al, "A Study on the influence of Emotional bias and Cognitive bias on investment decisions", Sambodhi journal, vol43, n0.4, October 2020, ISSN :2249 6661

Co-Author:

E Priyadarshini, Samuel E Chakkravarthy et.al, "Analysis of onion prices at wholesale level in India – an application of Rescaled Range Analysis", Journal of physics(CPCI/WOS), IOP publishers

List of Presentation in Conference and Seminars

1) Samuel E Chakkaravarthy, Goutam Tanty et.al "A study on the financial readiness of individuals in Chennai pertaining to retirement and health cover, National seminar on innovation in marketing, Indian institute for production management, Kansbahal, 15th February 2020

2) Samuel E Chakkaravarthy, Goutam Tanty et.al "A study on the financial literacy level of investors in Chennai", National Conference on digital transformation for socio-economic development of rural India, The Icfai university, Jharkhand25th February 2020

3) Samuel E Chakkaravarthy, Goutam Tanty et.al, "A study on the financial risk profile of investors in Chennai", Proceedings of International Conference on Mathematical Sciences, Sathyabama Institute of Science and Technology, March 4-6, 2020.