# IMPACT OF INVESTOR SENTIMENT ON INVESTMENT DECISION AND STOCK MARKET VOLATILITY

Thesis

Submitted in partial fulfilment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

by

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# D E C L A R A T I ON

I hereby declare that the Research Thesis entitled "**Impact of Investor Sentiment on Investment Decision and Stock Market Volatility"** which is being submitted to the **National Institute of Technology Karnataka, Surathkal**, in partial fulfillment of the requirements for the award of the **Degree of Doctor of Philosophy** in **School of Management** is a bonafide report of the research work carried out by me. The material contained in this Research Thesis has not been submitted to any University or Institution for the award of any degree.

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# C E R T I F I C A T E

This is to certify that the Research Thesis entitled "**Impact of Investor Sentiment on Investment Decision and Stock Market Volatility"** submitted by **Haritha PH** (148034HM14F07) as the record of research work carried out by her, is accepted as the Research Thesis submission in the partial fulfillment of the requirements for the award of the degree of **Doctor of Philosophy**.

**Dr. Rashmi Uchil**

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# ABSTRACT

Recent years have witnessed several changes in the Indian economic market mainly in the investment-oriented economy. The main components of economic growth are savings and investments. The impact of these economic changes in the Indian market has enhanced the involvement of investors in the stock market and other investment plans such as pension schemes, mutual funds and other deposits. Behavioral finance is a contemporary research stream that studies human fallibility in competitive markets. It explains stock pricing patterns that are not in line with classical finance theory and aims to integrate insights from psychology. It provides evidence that individuals tend to observe other informed traders before making investment decisions.

The purpose of the study is to describe the factors which influence investor sentiment leads to investment decision-making of individual investors. The major factors that affect investment decision-making considered in this study are herding behavior, market factors and awareness factors on investor sentiment in the Indian stock market.

The study used both descriptive and exploratory approaches to provide a comprehensive analysis of the research study. Data was primarily collected through a survey in the form of a self-administered questionnaire from individual investors. Secondary data was collected from the RBI website, NSE and SEBI website. The validity of the questionnaires was tested with the help of experts and a pilot study conducted on a small group of respondents. Data was collected from individual investors who invested in the stock market. The sample was chosen from major metro cities on probability and non-probability sampling. Data is analyzed using Pearson's correlation, Partial least square method, principal component analysis and GARCH model using SPSS, PLS and Eviews.

The results of the study indicate that herding behavior, market factors and awareness factors (media, internet, social interaction and advocate recommendation) on investor sentiment influence investment decision-making. Based on the findings of the study, it can be concluded that the decision-making of investors is highly influenced by investor sentiment. The result shows that investor sentiment has a significant influence on the investment decision-making of individuals. Insights from the study suggest that investors should consider the psychological and emotional factors while making an investment decision.

It also helps individual investors to avoid the problems faced while making an investment decision. The study could help investors to select a suitable investment aid and avoid repeating expensive errors, which arise due to investors' sentiment. It is recommended to increase the awareness regarding investors' sentiment among individuals, to increase their understanding of the financial settings and to make them confident while investing. Knowledge of behavioral finance would enhance the decision-making capabilities of individual investors in the stock market. Thus, the study calls for the need to increase awareness among Indian investors about behavioral finance and its usefulness in investment decision-making. This study also sheds light upon the behavior of Indian individual investors so that policymakers can take appropriate measures to provide the appropriate guidance. Policymakers can conduct awareness campaigns to increase investors' knowledge of the market conditions and to enhance proper investment decision-making among them. It confirms that the investor relies on their sentiment while making investment decisions. Hence, the stakeholders in the stock market should focus on investor sentiment and other psychological aspects of individual investors as well.

**Key Words**-Behavioral finance, Investor sentiment, Investment decision-making, Stock market volatility.

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## ABBREVIATIONS

| | |
|---|---|
| NSE | National Stock Exchange |
| SEBI | Security exchange board of India |
| ANOVA | Analysis of variance |
| NCAER | National Council of Applied Economic Research |
| ETF | Exchange-traded fund |
| EMH | Efficient Market Hypothesis |
| CAPM | Capital Asset Pricing Model |
| APT | Arbitrage Price Theory |
| OECD | Organization for Economic Co-operation and Development |
| FII | Foreign Institutional Investment |
| FDI | Foreign direct investment |
| VECM | Vector Error Correction Mechanism |
| GDS | Gross domestic saving |
| AAII | American Association of Individual Investors |
| RBI | Reserve Bank of India |
| NSE | National Stock Exchange of India |
| SEBI | Securities and Exchange Board of India |
| SPSS | statistical package for social science |
| PLS | Partial Least Square |

| | |
|---|---|
| PCA | Principal Component Analysis |
| WPI | Wholesale Price Index |
| IIP | Index of industrial production |
| ADF | Augmented Dickey-Fuller |
| GoF | Goodness of Fit |
| CPI | Consumer Price Index |

# CHAPTER 1

# INTRODUCTION

## 1.1 Chapter overview

The chapter lays the groundwork for the study by detailing the research problem, the purpose, the research objectives and research hypotheses. Section 1.2 begins with the introduction and is followed by the global investment scenario. 1.3 and 1.4 deals with the global investment scenario and the role of investment in the economic development of the nation. Section 1.5 gives individual investors and section 1.6 states that the investment decisions of investors. Section 1.7 emergence of behavioral finance and 1.8 deals research questions follows 1.9 gives research objectives. Section 1.0 and 1.11 identify the research hypothesis and statement of the problem. Section 1.12 gives the need for the study 1.13. Section 1.14 gives and scope and significance of the study and the chapter end with the summary in section 1.15.

## 1.2 Introduction

The stock market is a kind of financial market where traders buy and sell equities. It is also regarded as a requirement for a country's financial strength and growth. Thus, stock market movements or market trends represent a country's economic health. Participants in a stock market range from small individual investors to large institutional investors. The stock markets are often considered as the prime indicator of a country’s economic strength and development. Participants in the stock market often move asset prices away from their true value. The stock market is an important part of the capital market in the country through which one can carry out the transaction of capital.

The capital market is the source of finance for an economy, an important constituent of the financial system. It is a market for long term funds, both equity and debt. One of the important functions of a financial market is to link the savers and investors. This linking

helps in mobilizing and allocating money efficiently and effectively. It is the most extensive form of a market.

Capital market runs on the means of direct financing through the use of security and investment. The capital market is key to mobilizing resources for the country's economic growth. Capital market functions transform household and institutional savings into investments, building economic assets and developing asset-related goods. An effective securities market hence contributes to the sustainable financial development of any country in the world. The development of the securities market has a direct relation to a country's economic growth. It serves as a bridge between ultimate savers and ultimate investors and hence provides the ability to make careful savings available so that the overall investment and development rate are increased. It allocates limited money to businesses and hence forces them to concentrate on their results, which is constantly accessed via market share prices. It thus converts a given stock of investible resources into a large flow of goods and services. The development of the securities market changes the composition and amount of savings and investment of the households. The availability of yield bearing securities makes people consume less and invest more in high yielding, divisible, liquid stocks. The securities market facilitates the opening up of the economy by linking it with the rest of the globe. This linkage happens via the inflow of capital in the form of portfolio investment. Indian stock market plays a very important role in the growth of industry and commerce. It eventually affects the economy of the country to a great extent. The central bank of the country is also vigilant about its performance. The stock market has a direct impact on society, since it provides a platform to a large number of buyers and sellers at the same juncture and helps them to satisfy their need. It helps public companies to raise funds for their expansion or for settling down a new venture, which brings tremendous growth and development to the economy.

### 1.3 Global investment scenario

In the world only a few nations are not blessed with an abundance of natural resources, but still, only because of investment in industry and technology, they became economic

superpowers. One can take Japan as an example to prove this point. With its investments made on the technology front, it can become the fourth-largest economy in the world (World Bank group 2017). Globalization and Foreign Direct Investment is an important part of all the developed as well as developing economies. The underdeveloped economies are also dependant on these key factors for growth. These components equip the nation with new skills and provide access to markets and technology.

Today, every nation across the globe is looking for overseas and foreign investors. Whether it is India or China, everybody wants foreign investments. Recently, India and China were in the league of favorite destinations of investment. Foreign Financial Institutions play a major role in the Indian capital market, individual investors ' participation is the major boost to stock market growth and for reducing the volatility in the stock market. The market movement arises primarily due to the sudden exit or entry of foreign institutional investment in the Indian capital market. The regulators of capital Markets should not ignore individual investors, both in retail and net worth individuals as the long-term impact on stock market growth. Investors should undertake balanced decision-making processes to maximize returns based on available information, which in turn must be assessments free from emotional bias(Brabazon 2000).

### 1.4 Role of economic development of India

The developed and emerging market economies show indications that Gross Domestic Product development is increasing. India is expected to continue to be the largest and fastest-growing global economy with GDP development of 7.3 percent in 2019 and 2020 to 7.5 percent (NCAER 2018). In recent years changes are witnessed in the Indian economic market mainly in the investment-oriented economy. The main indicators of economic growth are savings and investments. The impact of these economic changes in the Indian market has also enhanced the involvement of investors in the stock market and other investment plans such as pension schemes, mutual funds, ETF’s and other deposits. The growth of the economy is dependent on the formation of capital, which depends on the investment made by investors, financial institutions, government agencies, companies, etc.

Therefore, any country must generate a fruitful environment for investment promotion through the formation of a structure that offers the person with all required efforts for investment making. Over the last few years, investors' behavior in the capital market has been interesting and one of the indispensables researched fields.

The past few decades have seen fundamental changes in the Indian financial condition, from saving oriented economy to investment-oriented economy. Due to the radical transformation made in policies, directed towards liberalization and globalization, the financial markets experienced product innovation, increased international incorporation, more transparency and coordination. Due to these economic expansions, the Indian financial markets jumped to active participation by retail investors in the capital market as well as, in another investment arena.


**Figure 1. 1Market movement and fluctuations**

*Source: Bloomberg*

India is the leading stock market in equity investment and it is a world's leading economic expansion. The economy of any country is driven by investments leading to capital formation. Savings lead to investments. In India, the household sector occupies the prime place as far as savings are concerned in comparison to institutional sectors, whether it is private or public. Every government in the world would like households to save, as

personal savings constitute the largest segment of national savings in most countries. This is followed by savings of the corporate sector, with government savings being very less in most of the countries.

### 1.5 Individual investors

Individual investors have an enormous amount of information to handle, part of which may not contribute to decision-making. In the capital market, individual investors are also regarded as small investors who vary in their conduct, needs, skills and knowledge. They have an insufficient understanding of financial characteristics and processes in the securities market to get of their rights from other types of investors. An individual investor who purchases a small number of securities for their investment as against an institutional investor is called an individual investor.

Individual investors activity occurs through the following channels;

1. The investor directly invests
2. He acts through a broker or agent
3. He joins an investment group - colleagues, friends, family members etc.

In India, the investors investing in equity-driven securities are provided income tax exemptions. As a result, many investors invest in them (Basu and Chawla 2012).

### 1.6 Investment decisions of investors

Decision-making is a complex process that can be defined as a process of choosing a particular alternative among several possible courses of action after careful evaluation of each. The most crucial challenges to investors are to make an investment decision, having a difference in their profile, like demographic factors, socio-economic factors. Investment is a time-consuming activity. Individuals and institutions make investments for a variety of reasons such as: earning a return, acquiring an asset in the future, saving enough for retirement etc. For making investments, a large number of alternatives are available ranging from a simple saving bank account to highly complex derivatives products. These investment products are traded in financial markets.

Savings and investment are the key variables that play a significant role in economic growth. Individual investors generally study their investment needs, objectives, and purposes while making decisions of investment. Investors' attitude is mainly influenced by various factors such as get-rich-quick strategy, dividend, stories of successful investors, investor awareness program, online trading etc. A superior understanding of behavioral actions and effects are important for financial planners because an understanding of how investors commonly react to market movements would help them in planning appropriate asset distribution methods for trade. Investments can range from simple bank savings accounts to complex stock and bond portfolios. The amount of evidence available for investing in various investment opportunities is continually growing. This has led to the emergence of many new companies and also many existing public and private companies in providing new and innovative financial instruments to the investors. With the diversification of financial markets, it has become relevant to understand the minds and decision-making styles of the individual stock investors. In recent years, it has become more and more noticeable that psychology plays an even more vital role in financial markets and also drives back the influence on the rational actions of the stock market participants. In finance research, there has been increasing curiosity in the psychology of individual stock investors, including their irrationality and emotionality (Aspara et al. 2014).

Investment decisions, financial economics and the interaction between financial markets and its agents have been studied differently by various researchers. Past researchers have been observing human behavior to realise the process of investment decisions. Over the last years, there is an ongoing debate between conservative theorists and behavioral theorists about drivers of investment decisions. Predominantly, the discipline of conventional finance was characterized by the assumption that markets are efficient and investors are rational (Lindmark and Ph 2017). This means that investors use all relevant information available to them while taking investment decisions(Hassan Al-Tamimi and Anood Bin Kalli 2009). Investment decisions of investors are influenced by rational or irrational factors that contribute to the efficiency or inefficiency of security markets. The

inefficiency is generally attributed to the behavioral biases of investors. Individual investors are more prone to behavioral biases than institutional investors(Shanthikumar and Malmendier 2011). Individual investor behavior is documented in (Barber and Odean 2000) amongst others. Investors in the capital market may be institutions or individuals. In the capital market the role of individual investors cannot be ignored since household's savings account for the major share of the gross savings in the country. Investor behaviour is characterized by volatility and over-reaction in both upward and downward movement of the stock market and various factors influence their decision-making processes. Investor psychology affects investment decisions. Before the results become certain, investors make investment decisions. Psychologists have found that as decisions become more difficult and involve higher levels of uncertainty, the decisions tend to be more greatly influenced by emotions and feelings (Cianci 2008).

Individuals making investing decisions face a daunting task (Ackert et al. 2006). Investors play a very important role in the financial market, which is found to have a great influence on the investor's behavior. These can affect the price of the securities, the volume of trading and the various other financial operations in actual practice (Ranganathan 2011). To get higher returns, mankind has always been persuaded to develop more and more avenues of investment. The establishment of the company form of organization and the subsequent trading in their shares and derivatives based on them are all an effort in this direction (Gupta and Chander 2010). Today, financial services and the economic sector generally are more highly diversified than ever. This diversification means that individual investors have a wider range of investment instruments and greater choice of how to invest their money (Warren et al. 1990). Financial professionals understand the impact of investor's psychology on the financial markets, the investor's emotions and its influence on the market movements.

### 1.7 Emergence of behavioral finance

Behavioral finance emerged due to the limits of conventional finance. It originated as a social psychological branch that captures the human side of decisions. Indeed, many

investors tend to use portfolio strategies based on the behavioral approach which helps in building a risk-return profile. Even if rational investors update their belief as per the information, often they come across beliefs regulated by behavior. The aim of behavioral finance is not to disprove the theories of conventional finance, rather integrate the irrational part of decision-making. The aim is to make a concoction of psychology based on emotions to make a human behavior-based approach towards decision-making. Affected by behavioral bias, the individual takes sub-optimal decisions which are deviations from the rational decision-making framework. They are affected by numerous biases that affect the ideology of profit maximization. Different dimensions of behavioral drivers have been tested empirically over the years and have supported the idea of departure from the investment decision framework based on a rational approach. Understanding investor behavior in the stock market is complicated as emotions, expressions, sentiments and behavior of the investors are not constant. Sometimes, the crowd behavior of the members of the financial market controls the overall decision-making in the market. Instances of market crashes have triggered a fall in the stock market indices. Frino et al. (2007) mentioned behavioral finance as a portfolio selection approach, a flexible model that suits the changing scenario of investors having different objectives. Funds that are designed on a behavioral approach suits different risk-return requirements.

Behavioral finance is an upcoming science and is considered a new and developing field of academic study which exploits the irrational behavior of the investors. Behavioral finance is about how investors behave rather than how they should behave. The investors' survey reflects the actual behavior and attitude of the respondents towards various decision-making. The capital market has seen a variation in terms of asset bubbles, financial crisis, and a decrease in investor's sentiments. This theory has concentrated on the study of investor's rationality and stock market investment and also on the inference of the cognitive process of the investor's behavior (Fromlet 2001). According to(Brabazon 2000) "investor behavior means the behavior of investors, which is to predict, judge, analyse and review the process for decision-making, such as investor psychology, defining and understanding, information collecting, analysis, and research. Investors need to create

rational decisions for increasing their returns which depends upon the information accessible by making judgments that are free from emotions". It is the study of the relationship between the stock market and investor's psychology. Fluctuations in stock prices reflect the behavior of investors. The biases of investor's psychology play an important part in these fluctuations in the market. Behavioral finance is a modern research stream that studies human fallibility in competitive markets. It explains stock pricing patterns that are not in line with classical finance theory and aims to integrate perceptions from psychology. Behavioral finance also involves studying the relationship between an investor's psychology and their stock market investment (Barberis and Thaler 2003). The classical finance theory where investors are rational and chase self-interest has many disadvantages in explaining the existence of systematic mispricing in the Indian capital markets. Consequently, behavioral finance has evolved and it says that the psychological aspects have an impact on the investors which leads to irrational decision-making in the markets and changes in stock prices (Shiller 2003). Behavioral finance is a classification of finance which studies the effect of the behavior of equity investors on the stock market. It also tries to determine the influence of psychological factors on the buy/sell decisions of the investors and subsequently its effect on the price in the market. It mainly concentrates on the influence of psychology on the behavior of financial experts and its overarching effect on the capital market (Sewell 2011). Oberlechner and Hocking (2004) disclosed that to know the reality of financial markets in the best possible way, behavioral and psychological methods can be used to analyze the decision-making and human information processing in markets. Shiller (2003) studied behavioral finance from a broader social science viewpoint, such as sociology and psychology.

### 1.8 Research questions

The research questions for the present study was identified based on the literature review. Research questions allow us to explore the relationships which are to be studied. The following are the research questions:

1. What is the effect of herding behavior on investor's sentiments towards decision-making?
2. What is the impact of market factors on investors' sentiments on decision-making?
3. How awareness factors impact investors' sentiments on investment decision-making?
    a) Does media influence investor sentiment on investment decision-making?
    b) What is the impact of internet in influencing investor sentiment on investment decision-making?
    c) Does social interaction influence investor sentiment on investment decision-making?
    d) What is the effect of advocate recommendation in influencing investor sentiment on investment decision-making?
4. What is the impact of macroeconomic factors on stock market volatility?
5. How does the investor sentiment index influence stock market volatility?

### 1.9 Research objectives

The study identified research objectives based on the research questions also analyzed the research gaps. The objectives of the present study is to provide insights into the impact of investor sentiment and to understand how investor sentiment affects the investment decision in the Indian stock market. The research question has supported the researcher to formulate the objectives of the study framed as follows:

1. To assess the effect of herding behavior impacting investors' sentiments towards investment decision-making.
2. To investigate the market factors influencing the investor's sentiments towards investment decision-making.
3. To analyze awareness factors influencing investors' sentiments towards investment decision-making.

a) To examine the influence of media on investor sentiment towards investment decision-making.

b) To assess the impact of social interaction on investor sentiment towards investment decision-making.
c) To determine the influence of internet on investor sentiment towards investment decision-making.
d) To examine the influence of advocate recommendations on investor sentiment towards investment decision-making.

4. To assess the impact of macro-economic factors on stock market volatility.
5. To construct and analyses the investor sentiment index influence stock market volatility.

## 1.10 Research hypothesis

The study includes hypothesis about the above-stated objectives. The research hypothesis formulated for the study consist of those related to herd behavior, market factors, awareness factors, macro-economic and investor sentiment index.

The following hypothesis are set to be empirically tested to study the above-mentioned objectives.

Hypothesis H1: There is an influence of herding behavior factors on investor's sentiments.

Hypothesis H2: There is an influence of market factors on investor's sentiments of equity investors.

Hypothesis H3: There is an association between awareness factors of investors' sentiment towards equity investors.

Sub-hypothesis H3a: There is an influence of media factors on investors' sentiment towards equity investors.

Sub-hypothesis H3b: Internet factor is associated with sentiment towards equity investors.

Sub-hypothesis H3c: Social interaction factor of investors' is associated with sentiment towards equity investors.

Sub-hypothesis H3d: There is an influence of advocate recommendations related to investor's sentiments.

Hypothesis H4: There is an influence on investors' sentiment towards investment decision-making.

Hypothesis H5: Investors' sentiment influences stock market volatility.

Hypothesis H6: Macroeconomic factors influence stock market volatility.

### 1.11 Statement of the problem

The process of financial reforms implemented in the country has created remarkable changes in various aspects of its financial system. The stock market is one of the most vital and dynamic sectors in the financial system making an important contribution to the economic development of a country. Investors are the backbone of the capital market. Due to the relationship between the stock market and investor behavior, the rise of the stock market affects the development of the economy. Thus, the decision of investors in the stock market plays an important role in defining the market trend, which then influences the economy of the market. Individual investors are the ones who get into trouble or crisis due to their investment in the wrong stock or other financial products. Since they are individual investors, they are not in a position to handle huge losses in their investment. As (Singh 2009) stated, the major issues of individual investors, a common error in judgments of investors occurs when they invest in losing stocks. This would, in turn, lead to bias and costly errors in judgments while investing. Insights from this study help individual investors in realizing one's strengths and weaknesses. It also helps financial advisors in advising their clients in a better way.

The Indian capital market has a wide variety of players including individual investors, foreign institutional investors and mutual funds. Individual investment activities take place under the control of institutional investment. Institutional investors, foreign and domestic dominate the Indian capital market. It is possible that because of the smaller holding and resulting vulnerability, the interests of persons are influenced. The need for small investor

needs to be studied. As institutional investors enter and suddenly exit the stock market they witness volatility. In this context the researcher is motivated to study the investor sentiment, investment decision-making and stock market volatility of the individual investors in the capital market. Additionally, it is essential to analyze the different psychological and demographic factors which influence the investment decision-making process. Unlike institutional investors, individual investors are influenced by several demographic and psychological variables. The psychological investment strategy is based on the assumption that stock prices are based on emotion rather than reason. This aspect of investors should be studied by the researcher. The study covers the factors which are influence investor sentiment that leads to investment decision-making and stock market volatility.

## 1.12 Need for the study

Over the past few decades, several psychological biases have been revealed which affect individual investor's decision-making. Due to the presence of psychological and emotional bias, uninformed individual investors lose money in the stock market. If investors understand these biases, then they can make better investment decisions. Very few studies have been conducted in the area of behavioral finance, the investors' sentiment and its influence on investors' decision-making in the Indian context. The issues which are applicable for developed countries' context may not be applicable in developing countries like India due to a variety of reasons such as cultural differences, risk aversion and attitude. Therefore, there is a need for further studies on behavioral finance in the Indian context so that the needs of various stakeholders in the stock market could be fulfilled.

There are not many systematic studies to investigate the variables that influence the investment decision-making of individuals (Chandra and Kumar 2012). Most of the research on investment and portfolio choice study examined how investors spend and allocate resources across assets and risky investments in capital markets. This study tries to incorporate individual factors that influence investor sentiment, investment decision-making and stock market volatility of the Indian capital market. Insights from the research

may also assist policymakers to implement policies that can avoid the exploitation of individual investors.

The present study is expected to add valuable contributions to the existing literature. First, it adds to the existing literature by examining the relationship of investment decision-making in the Indian stock market with a set of behavioral variables. Individual investors always affect the optimistic and pessimistic conditions in the market. While investing a huge amount of funds in securities, they sometimes face loss in their investment. When individual investors end up suffering huge losses, the effect of these is transferred to their family and ultimately to society. This study attempts to help an investor to make a proper decision regarding their investment by helping them and their price fluctuation of the equity market.

### 1.13 Scope of the study

The development of the capital market in India is apparent from the increase in the market capitalization of the leading stock exchanges in India, namely the National Stock Exchange and these stock exchanges are the major exchange for market capitalization and the number of securities traded at an international level (Menon et al. 2009). During the last decade, the inflow of institutional investor's funds has increased intensely. Each investor should share the growth and benefits when the stock market grows. The data of different institutions, however, clearly indicate that individual investors, particularly individual investors, are shy of the capital market. Thus, individual investors and their views on the capital market need to be studied. Hence there is a need to study individual investors and investor sentiment in the Indian stock market.

Behavioral finance is important for an investor to be aware of the various psychological bias encountered while investing. He or she may have ways of overcoming such bias while investing. Investor behavior is characterized by overexcitement and overreaction. The present study is the impact of investors' sentiments affecting investment decision-making and stock market volatility. It aims to probe into investment decisions, sentimental factors such as market, herding behavior, macroeconomic factors and awareness factors that

influence equity investors' decision-making. Hence this study is made to analyse the various factors in the investing behavior of equity investments of retail investors. The investor sentiment index is constructed and volatility is analysed in the context of the Indian stock market. The boundary of the study is individual investors in the major cities in India. To the best of researchers' knowledge, there are very few studies that analyse the impact of the behavioral factors on investors' sentiment and this leads to individual investment decision-making in the Indian stock market.

The study contributes to the body of knowledge in behavioral finance by studying investors' sentiments under two dimensions:

a) Understanding the influence of behavioral factors on investors' sentiment which, in turn, leads to investment decision-making.

b) Understanding the impact of investors' sentiment index and macro-economic factors on stock market volatility in the Indian stock market.

### 1.14 Significance of the study

Lately, it has become apparent that the wealth management and portfolio management require more accurate understanding than it was two decades ago. The changes in the socio-economic context have contributed to more and more responsibility for the well-being of people as well as a dramatic change in the financial market. The changes in the socio-economic framework have led to a growing commitment to human well-being and drastic modifications in the economic sector. The research aims to identify the factors in the current situation affecting the investment decision-making of the individual investor and to describe the source of heterogeneity for people. The data is substantiated through primary and secondary analysis. Investors may be able to make informed decisions based on behavioral factors like herd behavior, market factors, awareness factors, investors' sentiment and macroeconomic dynamics. The study is beneficial to know the relationship of prices and economic activity; the direction of the outcome of the relationship may enhance the predictive ability of policymakers; thus, both contractions and expansion of the Indian economy may be forecasted and predicted with some degree of certainty.

It is expected to offer some insights for Indian policymakers, investors, researchers, and portfolio managers. Understanding oneself, particularly the preconditions, would make better investment choices possible for the individuals. The financial intermediaries could personalize financial plans and products to suit their clients' needs by understanding the individual investor.

Policymakers could create strategies to promote a good investment environment for individual investors. Policymakers are mainly interested in exploring the determinants of the stock market, and how the stock market reflects the changes in domestic and international macroeconomic variables of the economy. Thus, the study provides them with a background to determine the variables, which are expected to influence the stock market. Moreover, economic theory suggests that stock prices should reflect expectations about future corporate performance, and corporate profits. If stock prices accurately reflect the underlying fundamentals, then the stock prices should be considered as the leading indicators of future economic activities, and not the other way around. Therefore, the study of the causal relations and dynamic interactions between macroeconomic variables economic activities and stock prices helps in the formulation of the nation's macroeconomic policy. The study would be beneficial to the financial advisors who guide their clients regarding various financial solutions including investment in the stock market. The financial advisors generally assess the risk profile of their clients but ignore the psychological, social and personality factors that govern their financial decisions. It would help financial advisors to assess their clients from a psychological point of view.

## 1.15 Summary and chapterization

This thesis is organized into five chapters.

**Chapter one:** Deals with the introduction of the study. This includes concept evolution and definition, the background of the study, objective, hypothesis, relevance, significance and operational definition.

**Chapter Two:** A literature review is an extensive review of the literature about the variable identified for the study. The chapter consists of the review of literature on herd behavior, market factors, awareness factors, investor's sentiment, macro-economic and investment decision-making. The literature review ends with the research gap, conceptual framework and chapter summary.

**Chapter Three**: Research methodology gives insight into the research approach adopted, the type of research design selected and the methodologies used for conducting the research. The chapter begins with a discussion on the approach to research and the justification for the selection of the pragmatist's view to research. The study uses a mixed method of research design. The methodology used a quantitative approach to collect data from the selected respondents. The primary and secondary data sources were used for this study. The sampling method followed was stratified and convenience which is given the nature of extensive data is to be collected. The construction of the questionnaire and the measurement of its validity and reliability are enumerated. The chapter ends with the test that is applied to interpret the data collected and a chapter summary.

**Chapter Four**: Data analysis and interpretation give the interpretation of the data analysed. The chapter begins with the application and the discussion of the variable for the study. The respondent profile is generated from the data collected. The variable is tested using descriptive statistics. The testing is done on an electronic platform using Statistical Package for Social Science (SPSS) software. Hypothesis testing is done using the ANOVA, factor analysis, and Warp PLS regression. The chapter ends with the chapter summary.

**Chapter Five**: It deals with the construction of investor sentiment index and stock market volatility using the GARCH model and Granger causality test.

**Chapter Six**: Figures mainly include the macroeconomy factors which are influencing the stock market volatility of the market.

**Chapter Seven**: Findings, recommendation and conclusion is the final chapter which details the findings based on the analysis of data. The chapter also points the direction for

future research and limitation of the study. The chapter ends with the conclusion of the entire study.

# CHAPTER 2

# REVIEW OF LITERATURE

## 2.1 Chapter Overview

This chapter discusses the progression of the theories of behavioral finance from the traditional framework. It critically analyses the importance of traditional theories in the field of finance followed by situations where they fail. It then illustrates the significance of behavioral finance in bridging the gap between traditional theories and real-life situations. Section 2.2 discusses the introduction and section 2.3 deals with the theoretical framework, section 2.4 discusses behavioral finance section 2.5 deals with factors affecting investor sentiment and investment decision making. The literature review paves the way for the creation of the literature map in section 2.6 and also the research gap for the study in section 2.7. Section 2.8 gives a conceptual framework. Section 2.9 states operational definition. The chapter ends with the chapter summary in section 2.10.

## 2.2 Introduction

Investment Behaviour is a cross-functional discipline, borrowing heavily from economics, finance, investment, psychology, and other allied disciplines. Therefore, the review of literature is done concerning multiple areas that are considered to be linked to the present subject of study. The following are the selected research studies conducted in the area of behavioral finance in the context of investor's sentiments and their factors. Diverse and more recent literature shows that factors such as fear, greed, and overconfidence also play a major role in investment decisions (Kahneman and Riepe 1998; Lo and Steenbarger 2005; Statman et al. 2006). Behavioral finance is a contemporary research stream that studies human fallibility in competitive markets. It explains stock pricing patterns that are not in line with classical finance theory and aims to integrate insights from psychology. According to (Baker and Wurgler 2007) "there are two major assumptions, namely limited arbitrage and the presence of investor sentiment. The first major underpinning of

behavioral finance is limited to arbitrage. Arbitrage can be defined as the simultaneous purchase and sale of the same or essentially similar security in two different markets for different prices. One-way behavioral finance formalizes the possibility of limited arbitrage through the noise trader model, which is one of the most cited alternatives to the efficient market theory. The second major foundation of behavioral finance is investor sentiment. Investor sentiment is the theory of how individuals form their beliefs about the market and future security prices". Practically, investors make decisions not only based on simple facts and obvious information but also very often based on their gut-feeling, comments, and opinions of other investors, and many more psychological traits. The stocks become overpriced or underpriced during periods of high or low sentiment, which leads to imaginable successive returns (Baker and Wurgler 2007; Lemmon and Portniaguina 2006).

### 2.3 Theoretical Background

Investments are comprehensive activities that require belief, from the selection of stock or assets to the construction of a portfolio. The decision is a rational activity and requires flexibility. Investors have not always known the events on the stock market and sometimes it adversely affects their return on investment and business performance. Several authors researched and reported multiple results on variables that influence investment decision making from different approaches. It is mainly a recent finance paradigm aimed at supplementing contemporary finance theories with behavioral elements introduced by an investor in the decision-making process. Financial decision-making forms part of portfolio management. The essential objective is to maximize the return on the portfolio. There are different methods available, such as fundamental and technical analysis investment.

The main assumption of the traditional finance model is that the individual is always rational. Standard finance theories are based on the assumption of rational behavior of investors and effective stock and bond markets. The financial economist assumes that people (investors) behaved rationally when making financial decisions, so psychologists observe that economic decisions are taken irrationally. Ritter (2003) has criticized strongly the traditional finance theories that believe in a rational investor's anticipated utility

maximisation. This study highlighted two aspects of behavioral financing, namely cognitive psychology (how investors believe) and the limit of arbitration (with inefficiencies in the market). Chaudhary (2013) found how behavioral finance describes the reasons why investors make irrational economic decisions, and how cognitive mistakes and emotions impact investor decision-making.

### 2.3.1 Efficient Market Hypothesis

According to traditional theory, investors are rational decision-makers and decide on rationality assumptions (Fishburn et al. 2008). It is primarily considered by the Efficient Market Hypothesis (Fama 1970) introduced the concept of efficient markets by introducing the concept of an Efficient Market Hypothesis (EMH) and has since been one of the major financial pillars. It is also one of the essential backbones of contemporary finance theory. In its easiest formulation the current price provides full information about the market. Investors are considered fully rational and need to use all the information available to create investment decisions. Even if some investors behave irrationally, rational arbitrators trade and price their basic value (Fama 1970). The theoretical basis of EMH is established on three arguments (i) investors are rational and value securities rationally (ii) rational arbitrageurs eradicate the effect of irrational investors on market (iii) in case some investors are irrational, their trades are random and cancel each other out without affecting the prices.

The efficient hypothesis of the market is based on the idea that individuals act rationally, improve the expected utility correctly and process the information accessibility. Shiller (1980) shows that stock prices vary more than just the future dividend, indicating that investors are not completely accurate in terms of stock prices and that other fundamental factors might affect their stock prices. The behavioral financial theory has developed to solve the problems of the EMH theory.

### 2.3.2 Noise Traders

The notion of how irrational beliefs held by investors affect the market by way of asset pricing and expected returns, According to the model developed by (Long et al. 1990),

“some investors, denominated as noise traders, were subject to sentiment – a belief about future cash flows and risks of securities not supported by economic fundamentals of the underlying assets while other investors were rational arbitrageurs, free of sentiment. The irrational beliefs were caused by noise, interpreted by the irrational traders as information, thus the term noise traders”. Even though such noise traders were recognized by proponents of an efficient market, they believed that the noise traders were exploited by rational arbitrageurs, who drove prices towards fundamental values.

### 2.3.3 Prospect Theory

Prospect theory proposed by Kahneman and Tversky (1979) theorizes how a particular individual or group of people generally behave in a world of uncertainty. They represent how individuals decide on concerns of uncertainty and value them. This theory was proposed as a best practice alternative to conventional wisdom. According to Prospect's theory, individuals are looking at alternative profits or losses for a certain reference point, in which the pain of loss makes people feel stronger than the satisfaction of equal gain. This theory shows the statistical average of each behavior. However, the basic empirics of prospect theory regarding the average behavior of choice have been well documented. The theory says individuals are irrationally reluctant to spend less on profits than on losses (Tversky 1999). According to (Tversky 1999) theory “states that people have an irrational tendency to be less willing to gamble with profits than with losses”. People, in particular, like to be certain and individuals overestimate results that are more certain than those deemed to be mere. It is certain that individuals are not unwilling to take risks, but are reluctant to take risks with profits (Kishore 2004).

**Features of prospect theory:**

- Prospect theory assumes that choice decisions are based upon a subjectively determined reference point independent of the decision maker’s state of wealth.
- Subjective reference points introduce a frame to a prospect, which affects choice behavior.

- A kink exists at the reference point of prospect theory's value function, assuming individuals' weight losses at above twice that of gains.

### 2.3.4 Arbitrage Price Theory (APT)

The theory of asset pricing is a pricing model that seeks to estimate the appropriate price of an asset while considering into account systemic risks common across a class of assets. It is an expansion of the Capital Asset Pricing Model (CAPM), based on the mean-variance by assuming the security method. In other words, CAPM is based on a factor that only one independent variable is the market risk premium. The anticipated homogeneous expectations, perfectly competitive markets and frozen capital markets exist, between the CAPM and the APT. such as (1) changes in the expected level of industrial production (2) unanticipated shifts in risk premiums (3) unanticipated inflation and (4) unanticipated movements in the shape of the term structure of interest rate. These factors are indicated by variables that assess the sensitivity of the resources to each factor. An APT method is a distinct one and draws its foundation from the one-price legislation. Two items cannot be sold at separate rates on an efficient market; otherwise, arbitration would exit. Ross (1976) proposed the concept of Arbitrage Price Theory (APT) as an important type of theory of asset price. APT incorporates several macro-economic variables to achieve the expected return on the risky asset. In his opinion, several financial forces are the main influences on stock returns. According to these models macro-economic can affect the stock price and return through the effect of anticipated dividends, discount rates or both of these macroeconomic variables like real output, inflation, the supply of money, and interest rate (Chen et al. 1986; Rahman and Mustafa 2008). According to (Chen et al. 1986) every single stock relies on expected and unforeseen variables. It thinks most investors return results from unexpected events and these factors are linked to general financial circumstances. In reality, although asset returns may also be affected by non-systematic economic factors, returns on big portfolios are influenced primarily by systemic risk, since the method of diversification eliminates idiotic returns on individual investments.

## 2.4 Behavioral Finance

Behavioral finance has been a challenging and sensitive topic in the field of finance. As investors play an important role in their stock market, they invest in many funds and decisions. The behavioral insights have evolved from the use of ideas from psychology in finance and economics. This theory explains that investors are not always rational, most of the time their behavior is irrational such as emotional investors have influenced the asset prices and the implication of portfolio selection of asset management. It describes that investors are not always rational, but mostly irrational behavior such as that mood investors have affected asset prices and the portfolio decision of asset management implications. Though investing the amount of fund and decision are made out, investors are considered to have a significant function in influencing their stock market. According to (Sewell 2007) "behavioral finance is the analysis of the effect of psychology on the behavior of economic agents and their subsequent effects of this behavior on financial market". Behavioral finance is a division of finance that studies the effect of the behavior of representatives in the financial market and it also determines psychological factors that influence decisions for buying and selling in the market, which in turn affects the prices. It mainly deals with the impact of psychology on the behavior of financial experts and its resultant strike on stock markets (Sewell 2011).

Behavioral finance, as a part of behavioral economics, is that branch of finance that, with the help of theories from other behavioral sciences, particularly psychology and sociology, tries to discover and explain phenomena that are inconsistent with the paradigm of expected utility of wealth and narrowly defined rational behavior. Behavioral economics is mostly experimental, using research methods that are rarely applied in the traditional, mainstream finance literature" (Frankfurter and McGoun 2002). However, the classical finance theory fails to explain the existence of systematic mispricing in the capital markets. Behavioral finance provides an alternative to the standard model. It argues that financial phenomena can be understood better if we assume that investors are not fully rational. In this setting, asset pricing incorporates not only how expected returns are related to risk but also how

returns are affected by investor misevaluation. The behavioral theory put forward a suggestion that when arbitrage is inadequate, noise-trader sentiment develops. It is characterized by the literature as an irrational practice on future cash flows and security risk that is not solely based on currently available information which may persist in the market, such that, assets that are held mainly by individual investors may differ from their fundamental values for a significant period (Long et al. 1990). It examines why people buy and sell financial assets trusting their psychological concepts of decision making. The classical finance theory fails to explain the existence of systematic mispricing in the capital markets.

Behavioral finance is an area of finance that addresses how the behavior of representatives in the financial market which in turn are determined by psychological factors and the subsequent influence on decisions made while dealing with securities and thus affecting the prices. It applies psychology to the study of financial behavior. It attempts to study why people buy or sell financial assets based on the psychological principles of decision making. It mainly focuses on how investors interpret and act on information during their investment decision making. According to(Shiller 2003) “suggests an alternative model of asset pricing built on two basic assumptions. First, investors are subject to sentiment. It argues that biases investors have that lead to irrational trading in the markets which induces variations in stock prices. Biased behavior is linked to several concepts like optimism or pessimism, biased self-attribution, limited attention and disposition effect”.

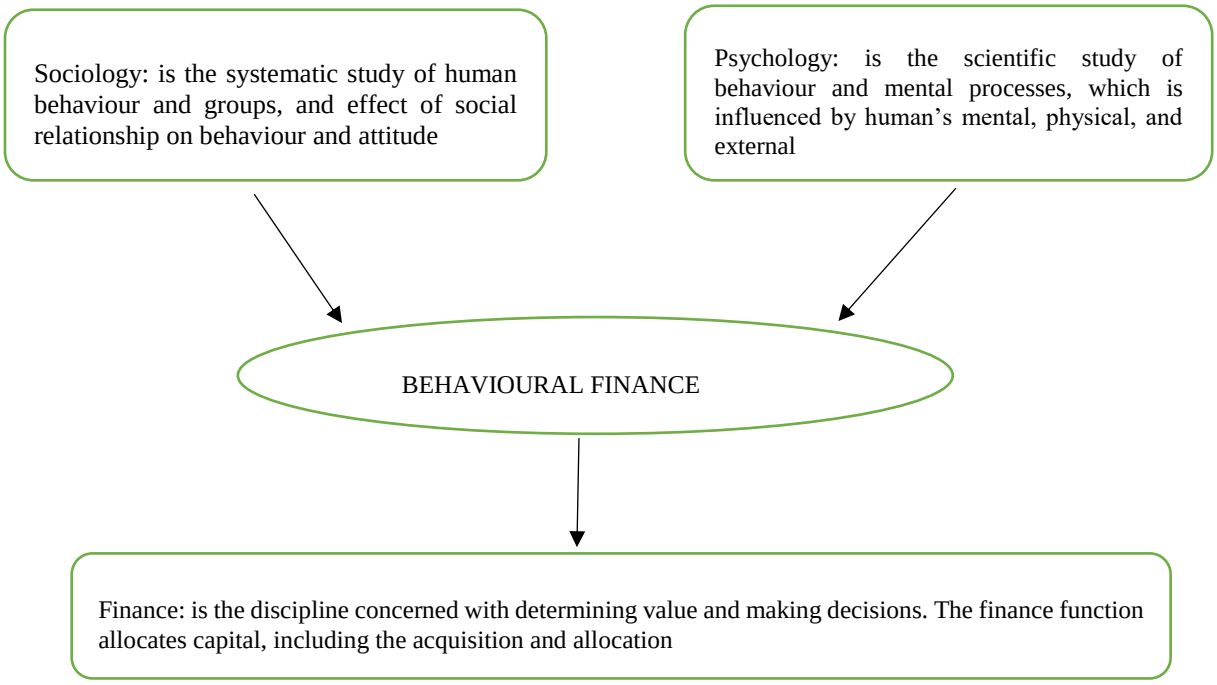
“Behavioral finance relaxes the traditional assumptions of financial economics by incorporating these observable, systematic and very human departures from rationality into standard models of financial markets. The tendency for human beings to be overconfident causes the first bias in investors and the human desire to avoid regret prompts the second” (Barber and Odean 2000).

Shleifer (1999) explains two major things in behavioral finance such as limited arbitrage and investors' sentiments. The most important basis of behavioral finance is limited to arbitrage. It can be defined as the buying and selling of the identical or essentially similar

security simultaneously, in two different markets for various prices. It also validates the chance of limited arbitrage through the noise trader model. The second main basis of behavioral finance is investor sentiment. Investor's sentiments can lead to market bubbles and variations of the price of a security in the market. Investor's opinions, attitude and decisions are mainly influenced by emotions, risk and future cash flow. These are mainly concerned about two things a) Representativeness Heuristic, i.e. the tendency of people to think as a representative for some specific asset classes or process of probability and b) Conservatism which indicates people to slower modernizing the models in the face of new evidence that is essential. These two results are an overreaction and underreaction of investors in stock markets. Limits to arbitrage, which arise because arbitrageurs are likely to be risk-averse and have short time horizons, fluctuating prices are not always forced to fundamental levels (Barberis et al. 1997). Furthermore, the unpredictability of noise traders' sentiment, causes additional risk in the market. But, betting against not-fully-rational investors is risky and can be costly. If noise traders' sentiment is stochastic and noise traders act in concert, they might cause systematic risk, which cannot be diversified away. It is about how individuals form their opinions regarding the market and future stock prices. In practical, investors conclude not only based on mere facts and evident information, but also frequently based on their opinions, comments, and the notion of other investors, and several other psychological behaviors.

Moreover, the unpredictability of noise traders' sentiment causes additional risk in the market. In other words, betting against not-fully-rational investors is risky and can be costly. Behavioral finance provides an alternative to the standard model. It argues that financial phenomena can be better understood, if we assume that investors are not fully rational. In this setting, asset pricing incorporates not only how expected returns are related to risk but also how returns are affected by investor misevaluation. According to ( Long et al. 1990) the behavioral hypothesis proposes that when arbitrage is limited, noise trader sentiment, which is characterized by the literature as being an unreasonable belief about future cash flows and investment risk that is not based solely on currently available information, may persist in the market, such that assets that are held mainly by individual

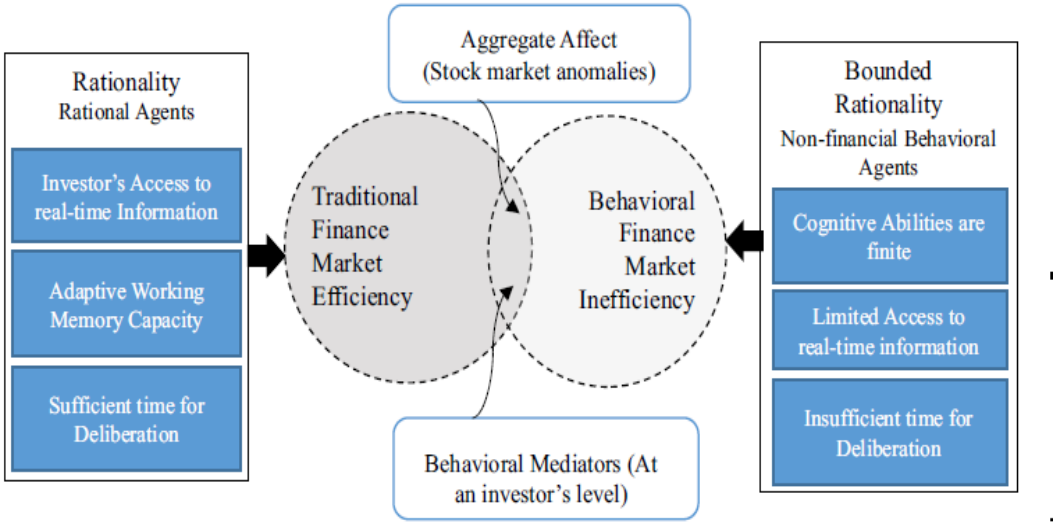
investors may diverge from their fundamental values for significant periods (Long et al. 1990). Shleifer (2000) explains two major things in behavioral finance such as limited arbitrage and investors sentiments.




*Source: Schindler (2007)*

**Figure 2. 1 Evolution of behavioral finance**

It is a contemporary research stream that studies human fallibility in competitive markets. It explains stock pricing patterns that are not in line with classical finance theory and its objective is to integrate perceptions from psychology with neo-classical economic theory. Linter (1998) has defined behavioral finance as being a study of how human interprets and act on information to make informed investment decisions. Olsen (1998) asserts that behavioral finance seeks to understand and predict systematic financial market implications of the psychological decision process.




*Sources:* Nigam et al. (2018)

**Figure 2. 2 Conceptualizes this interaction between behavioral foundations of decision making**

Figure 2.2 conceptualizes the interaction between individual behavioral decision-making fundamentals and rational agents of traditional finance models leading to aggregate market phenomena.

### 2.5 Factors affecting individual investment behavior

From a psychological view, a study shows that it took many decades for economic psychology to set off from social psychology. Metawa et al. (2019) suggested the relationship between investment decision making and demographic characteristics (gender, age, experience and education level) through the mediating factors of behavioral factors (overconfidence, investor sentiment, herd behavior, overreaction and underreaction). In this study, the major factors which influence investor sentiment and investment decision making are herd behavior, market factors and awareness factors (media, social interaction, internet, and advocate recommendation)

### 2.5.1 Herd Behavior

Individuals who think similarly are referred to as herding. It represents, that any expert investors invest in the stock, while others will follow the investment in a similar type. The key factor of market sentiment is herd behavior (Lakonishok et al. 1992; Liao et al. 2011a). In the financial market, herding means the behavior of the investors to imitate the investment decision of others rather than their own beliefs and information. which means common imitation prominent to a convergence of action (Hirshleifer and David, 2003). Scharfstein and Stein (1990) studied that certain forces which can specify herd behavior in investment. Under certain circumstances, in this study, the managers imitate the investment decisions of other managers. Herding is created on the trend to follow similar sources of information and taking related financial decisions of investors (Hirshleifer et al.1994). Christie and Huang (2006) found that herding means a tendency to follow the action of others. Banerjee (1992); Bikhchandani et al. (2002) suggested that while individuals cannot access the private information of others, this information is exposed through the efforts taken by these investors. The indication of herding behavior among the market participants has a direct proposition to the market efficiency of information as much as the behavior of asset pricing. Some previous studies have revealed that when investors face a small number of choices and high government concerns, they are predisposed to speculate in the stock market and to create instability (Green and Hodges 2002). Park and Sabourian (2006) suggested that investors are affected by the decisions of others investors and get involved in herd behavior, the result was found to be that the process of the market is influenced and increases the market risk.

Herding factor is the tendency of other investors' trading decisions of the stock volume that has an impact on investment decisions. The herding happens in identical markets with another investor in a similar time, by giving other investors decision and information more important than own (Patterson and Sharma 2007). It can be observed that as a tendency of an investor in stocks to invest where everyone else is investing. It is a wrong perspective of an individual to make easy money by following the perception of other investors. There

are other factors such as consider stories of successful investors while investing in the share market and also give importance to the opinion of peers while investing. Salem (2019) studied Arab women investors' behavior, it mainly affects investment confidence, investment literacy levels, herding behavior and risk tolerance. The major results of the study are the investors invest less in the stock market and the higher herding behavior and lesser confidence, investment literacy, and financial risk tolerance levels. Herding is similar to thinking among individuals. It describes as any experienced investors invest in any stock, others will also follow the same category of investment. According to Scharfstein and Stein (1988) "States that some of the forces that can indicate herd behavior in investment and its initiates that under certain circumstances, the managers simply imitate the investment decisions of other managers in managing essential private information. While this behavior is ineffective from a social viewpoint, it can be rational from the perception of managers who are alarmed about their standings in the labor market". Iihara et al. (2016) explain herding behavior in various classes of Investors on the Tokyo Stock Exchange. The money-flow instruments permitted the separation of the dimension of sentiment from the measurement of asset returns. Chang et al. (2000) discussed this behavior as a method by which market participants base their investment decisions on collective arrangements alone, defeating their own opinions. Hirshleifer et al. (1994) discuss that herding is based on investors intention to pursue the same sources of information, to interpret signals on the market in a normal manner and to make comparable economic choices. Consequently, correlated behavior aspects occur when people have access to or interpret the same information sources equally.

"Herding behavior can be influenced by the market's degree of sophistication" (Balcilar and Demirer 2015; Patterson and Sharma 2007). There are narrow sizes and low liquidity in the Portuguese market, indicating conduct which may vary from significant world markets like the US. Lack of liquidity can affect market behavior, as the expected intervention may not be able to take some time, particularly when other investors are not replicated. It is an identical ideology among individuals. It elaborates investors' experience in the stock market that can be followed by an identical strategy. Cheng et al. (2000)

pointed out the methods of behavior by which the investors of the market fix the decisions of investment on collective actions suppressing personal beliefs. It can be affected by the degree of market sophistication (Patterson and Sharma 2007; Scharfstein and Stein 1988). Subsequently, when the same data source has accessed by the individuals and correlated the pattern of behavior. The herding happens when individuals copy what others do in market investment (Banerjee 1992). Market sentiment may be a key factor of herd behavior (Lakonishok et al. 1992; Liao et al. 2011). According to (Hirshleifer and David 2003) "herding in financial markets can be defined as mutual imitation leading to a convergence of action. This is the most common mistake where investors tend to follow the investment decisions taken by the majority". Herding as per academic literature refers to the lemming-like behavior of investors looking around, seeing what each other is doing, and heading in that direction. It represents the tendency of individuals to mimic actions such as rational or irrational of a larger group. Banerjee (1992) suggests that herding takes place when people do what all others do, even if their private information indicates to make a distinct choice. Chang et al. (2000) note as a mechanism by which market respondents alone base their investment decisions on collective actions, eliminating their own views. Patterson and Sharma (2007) suggest that herding happens where an investment group trades in the same securities on the same side of the market or where investors over the same period disregard their personal information and behave as other investors do. Hirshleifer et al. (1994) argue that the herding existence is based upon investors ' tendency to pursue the same sources of data and to interpret the signals transmitted to the market in a homogenous manner, and to adopt comparable economic choices. Consequently, if people have or interpret the same data sources, certain conduct patterns happen. Bikhchandani et al. (2002) say that herding is difficult to regulate for the basics in field research, which breaks the connection between theoretical models and empirical requirements of herding. The experimental strategy allows the control of environmental parameters that are essential to theory, allowing theoretical predictions to be tested directly and without using imprecise proxies. The failure to observe the trader's personal information signal is a key issue for field research. In such situations it's difficult for traders to test their data to imitate other tradesmen such as herds,

or because they respond to the same government data. It's not easier to determine if traders make similar choices. Herding concept and experimental designs tend to prevent traders from choosing when to trade or allowing them to trade in various trades. In an innovative experimental design. Park and Sohn (2013) explore the impact of incorporating more realistic characteristics in a market where respondents can trade one or two units and where a sequential trading system is endogenously determined rather than exogenously enforced. Pericoli and Sbracia (2003) provide a theoretical framework for contagion research and empirical research assessment. Behavioral pattern is correlated among individuals. The process of behavior and the investment decision among the market participants are based upon their collective action and their belief (Devenow and Welch 1996; Sciubba 2000). If all individual invests, everyone should invest even when their information on their own proposes to take various decision, (Banerjee 1992). Park and Sohn (2013) suggested that trade endogenous timing does not alter predictions obtained from sequential models of herd behavior, so the results of previous experimentation indicate that the sequence of trade is likely to remain valid. Hirshleifer et al. (1994) suggested that the tendency of investors to follow similar sources of information conveyed the market interpretation for taking the same financial decisions. Investor sentiment based upon their future cash flow of the security (Long et al. 1990) investors decisions are affected by the market price of the security and its high risk.

### 2.5.2 Market Factors

Bondt and Thaler (1994) that stock markets can be influenced by investors' behaviors. According to them, it is supposed that the investors may have an over- or under-reaction to price changes or news, the focus on the population of seasonal and stock price cycles, lack of attention to fundamentals underlying a stock, extrapolation of past trends into the future. Above mentioned factors, gradually affect investors decision making in the stock market. Lai et al. (2001) pointed out that over-reaction and under-reacting to news may affect various trading strategies by investors and hence impact their decision-making on investment behavior. Certain other factors like corporate earnings, get rich quick, and past

performance of the firms stock was considered by (Hassan Al-Tamimi and Anood Bin Kalli 2009) substantiated its influence on decision making. Ngoc (2013) studied that market efficiency moves market prices which subsequently reflects fundamental market characteristics and in the long run, excess returns are evened out on average. Generally, variations in fundamentals of the underlying stock and its price can result in over or under-reaction to the price change, market information. This has proven to influence the decision-making behavior of investors in a key role. Waweru et al. (2008) pointed out that the market factors such as customer preference, market information, fundamentals of underlying stocks past trends of stocks, price changes, and over-reaction to price changes also influence the investors' decision making. Chawla (2014) studied that investors consider past performance for investors. Lee et al. (2002) described that individual investors are more liable for adopting herding behavior than are institutional investors. The market effect that has an impact on investors' decision making, the items of the market variables are price changes, over-reaction to price, market information, customer preference, and past trends of stocks are the key factors of the market (Waweru et al. 2008). Market efficiency (Ngoc 2013) means that market prices affect excess returns and the market characteristic, in the long run. Price change of stocks has an influence on their investment behavior (Waweru et al. 2008; Hengelbrock et al. 2013) recommended that measures of investor sentiment have systematic power for future stock returns over the intermediate and long-term. The study proposed that smart investors should trade on the information carried by such indicators and thus caused an instant market response.

Market factors consist of price change, market information, the past trend of the stock, fundamentals of the underlying stock, preference of the customer, the overreaction of changes in price. This study recommended that investors should trade on the information carried and caused a prompt response in the market. Waweru et al. (2008) state that market factors that have a high influence on investors' decision making. Market information, fundamentals of underlying stocks, customer preference, price changes, past trends of stocks, and over-reaction to price changes, are the important factors of the market. Bondt and Thaler (1994) identify that capital markets can be influenced by investors' behaviors

in the way of behavioral finance. If the views of behavioral finance are correct, it is investors may have under-reaction or over- or to price changes, a lack of attention to fundamentals, underlying a stock extrapolation of past trends into the future, seasonal price cycles and focus on popular stocks. These market aspects are mainly impacting the decision making of investors in the stock market. Barber and Odean (2000) studied that investors prefer selling and buying stocks that can be changed in stock price are reflected as an attention-grabbing occurrence in the market. Furthermore, investors may revise inaccurately the assessments in the return of stock to deal with the changes in the price that influence their decision making of investment (Waweru et al. 2008) Usually, fundamentals of the underlying stock, changes in market information, and stock price can basis over or under-reaction to the changes in price and these changes are proved to the high influence on investors decision-making it mainly proves that under-reaction (Lai 2001) or over-reaction (DeBondt and Thaler 1985) is the result in diverse strategies in trading s by investors and therefore influence their decisions on investment. Due to overconfidence, investors try to invest more in investment. These investors completely rely on the information quality of the market that they know when investment decisions (Barber and Odean 2000). Waweru et al. (2008) pointed out the price variation of stocks influences their investment behavior. Barber and Odean (2000) confirm that investors prefer selling to buying stocks that experience more price changes during the last years, it suggested that investors generally select the stocks that attract their attention and the selection of stock mainly relies on the investors' preferences. Liao et al. (2011) identified that sentiment can be the cause of investor decisions that have been recognized. The significance of sentiments in decision-making has been verified by academic research.

Market sentiment represents the expectations of participants in the market and is, therefore, a measure of investors' global subjective perception. The general view of investors in anticipating pricing growth in the market is the market sentiment. It is the accumulation of several basic and technical variables. According to Hengelbrock et al. (2013) "recommended that approaches of investor sentiment have systematic power for future stock returns over the intermediate and long-term and its proposed that smart investors

should trade on the information carried by such pointers and thus caused an instant market response". De Bondt and Thaler (1994) state that the behavior of investors in behavior financing could affect financial markets. If the view on behavioral financing is correct, investors can react more or less to price changes, extrapolate from previous trends into the future, fail to address the basic inventory bases, concentrate on common stocks and price cycles for periods are considered to be accurate. These market variables also affect investors ' decision making on the stock market. Waweru et al. (2008) identify market variables that affect the decision-making of investors. The primary market variables include price adjustments, market data, previous stock trends, client preferences, price change overreactions and basic stock fundamentals.

Market efficiency (Ngoc 2013) has been brought into question by behavioral financing since market prices represent basic market characteristics and the long term flattening of surplus revenue in the long run. There has been the use of conventional financial theory to indicate market irregularities such as unusual price movements, mergers, stock splits, and spin-offs. These investors are entirely supported by the quality of data they have on the market or stocks when making investment choices. Waweru et al. (2008) Indicate that the variation in stock prices has an effect at some stage on their investment behavior.

Waweru et al. (2008) conclude that market information has an extremely significant effect on investors' decision-making, which makes investors tend to concentrate in one manner or another on successful stocks and other occurrences relating to investment information. Barber and Odean (2000) emphasize, even when these occurrences cannot lead to successful future investment performance, that investors are affected by events in the stock market that capture their thoughts. It explores the excessively high level of confidence in many investors. These investors depend entirely on the market or stock information quality when they decide to invest and investors prefer buying to selling stocks that experience higher price changes during the past two years. In this sense, changes in stock price can be seen as a focus for investors on the economy. Many investors tend to concentrate on famous or hot stocks on the market (Waweru et al. 2008). Barber and Odean (2000) suggest that investors generally choose stocks that are attractive to them. Furthermore, the choice of

stocks relies on the preferences of investors. Investors may prefer stocks with excellent current results while rational investors tend to sell losers in the past, and this could assist them to postpone taxes. In contrast, behavioral investors prefer to sell their previous winners to postpone the regret of a loss that their stock trading decisions can achieve, Moreover, past stock trends are also found to influence investment conduct at a certain level (Waweru et al. 2008). This concept generally involves investors analyzing past stock advancements with techniques of assessment before deciding on an investment. Market factors are generally not included in behavior variables as they influence the behavior of investors. However, market variables affect behavioral investors and rational investors in various respects, so that when the behavioral variables that affect investment choices, they do not adequately list market variables. The financial market has a close association with investors' behavior and behavioral pattern which in turn influences several market dynamics and decision making (Bondt and Thaler 1994). Prices these days are often determined by the past trend of stock (Krause et al. 1970; Shiller 1998). Market prices affect fundamental market characteristics (Ngoc 2013). Market factors are treated reasonably by this study as behavioral variables that affect investors ' decisions in the stock market.

### 2.5.3 Awareness factors

Awareness is the capacity to understand, perceive, feel and be occurrences directly. Awareness of investment is one component of financial knowledge. Investor awareness has been used and can be broadly defined “as providing familiarity with the investment environment and understanding of financial market products, especially rewards and risks, to make informed choices” (Acquah-sam and Salami 2013). Financial awareness plays an important role in the financial planning of an individual. Proper financial awareness enables better financial planning. Organization for Economic Co-operation and Development (OECD) (2005) defines financial awareness as a mixture of consciousness, understanding, skill, attitude and behavior, required to create good economic decisions. Also, it is defined as “the process to inculcate the ability to understand personal financial

well-being. It includes the awareness about financial products, market information, sources of getting financial knowledge and confidence in discussing financial issues so that a person can plan for the future and make proper decisions to meet out the life events" (Purohit and Rohella, 2015).

Investors usually make market investments taking the advice of their broker or friends and relatives and sometimes on the base of some tips given in news channels and some websites. Some investors choose their portfolios themselves due to prior knowledge. The awareness level of investors is an important reason that influences investment behavior. Investors generally invest in the market with the guidance of their brokers or friends and families, and occasionally with tips on news channels and certain websites. Some well-known investors have also opted for their investment portfolio and a significant factor influencing investment behavior (Chou et al. 2011 and Rajeswari 2014). Technology advancement is the energetic sharing, creation, and association of web users. In this time, the media effect on the stock market has increased. Every part of the investment process includes people interacting with one another. Investors exchange and discuss stocks market information with neighbors, relatives, friends, and colleagues. Advice is sought from advisors, analysts, bankers, and planners. The main awareness level of factors includes media, internet, advocate recommendation

#### *2.5.3.1 Media*

Another major source of information is the media like reports published in major business and national newspapers, channels, and websites. Media forms a major influence in the decision making (Shiller 2001) many people get the awareness of any product through the media. It is observed that the media plays a chief part than another source of evidence that influences the investors buying and decision-making process. García and Urosevic (2013) learned the interrelations between immediate market response, news stories sentiment and the role played by media in financial markets. Tetlock (2007) suggested that the pessimistic media can influence investors' sentiment on the market. Kunda (1990) noticed that investors stay focused on media sentiment but conflicts arise with the fundamental market

sentiment in certain cases. For instance, a negative media sentiment at one time may create a positive market sentiment or remain unaffected. Tetlock (2007) studied that the measure of media content either harms the sentiment of an investor or risk aversion. The media pessimistic variables prefigure blueprints of market activity which are uniform with them. Barber and Odean (2008) examined the trading verdicts through investors' consideration that has been put forward by the news. A difference was made between professional investors and individual investors, where the latter are expected to buy shares on high-attention days. Professional investors are unlikely to be affected by such incidents. The news media are in constant competition with each other to attract customers. Multiple qualitative researchers have identified the media as an important factor in media coverage (Da et al. 2014 and Tetlock 2007). Solomon et al. (2014) study media-induced diversification in the mutual fund industry where media coverage affects fund flows. (Chang et al. 2013; Wang 2018) found that the influence of media coverage on stock market return and investor sentiment, and this effect is highly significant among the various degree of media coverage of the stock group. Lakshmi (2005) studied media's role in individual decision making. Most individuals receive media knowledge of any item. The media play a bigger part in the decision-making process than any other source of data. It said that not only does the press increase government awareness but also plays a crucial part in supplying them with the necessary information. García (2013) learned the interrelations between immediate market response, news stories sentiment and the role played by media in financial markets. Tetlock (2007) suggested that the pessimistic media can influence investors' sentiment on the market**.** Preis et al. (2013) noticed that market activities can be observed using Google Trends. Even though investor sentiment and media sentiment may act independently. De Long et al. (1990) pointed out the models of noise and liquidity traders. Large values of media pessimism stimulate downward coercion on market prices, however unusually high or low prices of it result in temporary high market trading volume. Online media showcases to be open and unstructured. It also probably contains very little fresh information which is incremental to the released public news. An ample amount of internet messages is created and displayed by noise traders or ignorant investors who might

be subjected to peculiar notions and sentiments, also their information is likely to be non-precise or dependable. Inexact words, their opinions and reviews may contain a very small ratio of information to noise. It is believed that internet postings are not a beneficial source of information for examining market efficiency.

Real investors are influenced by the media. According to Lakshmi (2005) “stated that media is not just creating awareness among the public but also playing a vital role in terms of providing the required knowledge. They tend to buy, rather than sell, stocks when those stocks are in the news. This attention-based buying can lead investors to trade too speculatively and has the potential to influence the pricing of stocks”. García Blandón et al. (2011) focus on the interrelated sentiments of news stories and direct market reaction and add an understanding of the media's position on financial markets. The internet is likely to be noisier than the corporate or media expressed feeling that news plays a significant role for investors when assessing fair stock prices. Expectations crucially depend on the information set that is available to investors. Tetlock (2007) found a systematic exploration of the interactions between media content and stock market activity. It constructed a straightforward measure of media content that appears to correspond to either negative investor sentiment or risk aversion. Pessimistic media content variables forecast patterns of market activity that are consistent with the (De Long et al. 1990) models of noise and liquidity traders. High values of media pessimism induce downward pressure on market prices; unusually high or low values of pessimism lead to temporarily high market trading volume. High-relevance news induces an increase in market activity, with negative news sentiment having a greater impact than positive news (Klubmann and Hautsch 2011; Smales 2014). Tetlock (2007) is an expert in the exploration of news sentiment on activities of the stock market and was one of the first to directly use news sentiment as a factor. Lillo et al. (2015) investigate the trading behavior of a large set of single investors on sentiment analysis of the news. The trading activity of all the investigated categories of investors is significantly correlated with both the flux of news and the daily volatility (Tetlock 2007). Wisniewski and Lambe (2013) suggest that news might influence future market

movements while there is only weak evidence that journalists repeat prior news. Media also influences the decision making of the investor (Shiller 2001).

Research, in general, supports the relationship between investors' decision making and media factors (Kraussl and Mirgorodskaya 2014). The stock price overreacted to negative news and underreacted to positive news using a rational expectation (Veronesi 1999). The media influences in such a way that the stocks associated with private information experience low or insignificant movement while those associated with public information drift positively (Vega 2006). Davis and Kahn (2008) found that the market crisis period, the media can impulse trading activity to extremes and can generate a positive attitude towards trading. Buying or selling decisions of the traders react constantly to the news and information about upcoming events (Shiller 2005). Tetlock (2007) suggested that media pessimism and investors' sentiment have psychologically interconnected to the news and market prices. Kunda (1990) focused that an investor is observing the sentiment of media but in certain cases, fundamentals of the market sentiment will show the conflicts. For an occasion, media having a negative sentiment at a specific time may generate to be at remain unaffected or positive market sentiment. Vega (2006) investigated that stocks associated with privately available information experience and the public news are affected by the media. Tetlock (2007) suggested that for a stock market investor sentiment can be affected by a pessimistic media. The stock price underreacted to positive news and overreacted to news of negative impact using a rational belief (Veronesi 1999). Davis and Kahn (2008) generated the concept that media can make the trading process impulsively to its extreme and can create trading of positive attitude in the market crisis period.

#### *2.5.3.2* ***Social interaction***

Social interactions play a significant role in the selection of stock (Massa and Simonov 2004). These are those actions, of people towards each other or behavior that tries to influence the other person's subjective experiences or intentions (Rummel 1976). Shiller (2005) state that social interaction makes changes to investor sentiment and it makes a vital contribution to the asset price formation. Ozsoylev (2006), found that in social networks,

the same group makes similar decisions, whereas people in different groups in the network make different decisions. This suggests that the investor and the group he belongs to influence the investor's decision. It is found out that the making of portfolio decision changes with social interaction. Hong (2004) show that social interactions alter the stock market participation of individual investors. Interpersonal communications, social interactions, and expert recommendations have a strong influence on the trading behavior of investors (Shiller and Pound 1989; Shiller 1990). Social interactions are the communication between the peoples in the stock market and those whoever relating with the firm which the investor wants to invest and all other interactions related to it. Shiller (2000) proposed that investor sentiment transmitted through social interaction plays a crucial role in the formation of asset pricing bubbles. Knupfer (2008) found the association between social interactions and the portfolio of local stock. Social investors have higher local biases than reserved investors. Social interactions play a significant role in the selection of stock (Massa and Simonov 2004). Human interaction and peer groups have substantial effects on the decision making of financial information (Duflo and Saez 2002).

A stock market is the different participants and interaction with one another, thus creating the individual investor's decision. Loewenstein et al. (2001) Furthermore, social interaction is getting affected by the prices in the financial market (Granovetter 2005). In social networks or groups, various decisions are obtained from people in various collections, while a similar collection makes the same. This means that the investor's decision making is affected by the participation of groups. Ozsoylev (2006) studied that social people interact more related to the investment will be benefited to the stock market investment. Hong et al. (2002) pointed out that people who interact with society more will be influenced more by the investing capability in the stock market. Shiller (2005) proposed that investor sentiment transmitted through social interaction plays a crucial role in the formation of asset pricing bubbles. Knupfer (2008) found the association between social interactions and the portfolio of local stock. Social investors have higher local biases than reserved investors. Ozsoylev (2006) suggested that, it is in a society of social networks, the people from different collections can result in decision variations among the group and

people from the same collection make the decision the same. The decision making will be affected by the participation of group influences for an investor. Human interaction and peer groups have substantial effects on the decision making of financial information (Duflo and Saez 2002).

#### *2.5.3.3 Internet*

Nowadays internet trading also increases individual investors (Barber and Odean 2000). Online investors in particular now take decisions in a different environment than investors in the past. They have access to far higher data and act without personal intermediaries, also, it can conduct extensive searches and comparisons on a wide variety of criteria. Impact on internet and sentiments is an upcoming area of behavioral finance and it requires separate attention and sparsely studies in the context of investor's sentiments. Largely unexplored and a critical research question is how this various environment touches the investors' decision-making (Barber and Odean 2001). Services offered by people during olden days are replaced by advanced technology like computers and software. This challenges traditional practices in the brokerage firms and the stock market. The Internet has facilitated the sharing of knowledge and information with others. Internet trading is showing a sharp rise due to the technological revolution taking place worldwide (Barber and Odean 2000). Kim and Kim (2014) found investor sentiments expressed as posted messages have predictive power for the stock, returns, and volume of trade. Antweiler and Frank (2004) concluded that messages in internet chat rooms which specifically recommended to buy, sell or to hold had a high impact rather than other general messages. Barber and Odean (2000) found that the internet has changed the landscape for financial advice, brokerage and decision-making of investors. They also revealed that the internet in many cases provides a deception of knowledge which may boost the overconfidence of online investors and alter the decision criteria. News plays an important function for investors in judging stock prices. Expectations essentially rely on the information that is readily available to investors. It consists of qualitative and quantitative information of

varieties that are from different sources, like corporate disclosures, analyst reports, and news articles.

Internet is the main source of information in the financial markets about the security traded in the market, which leads to the creation of a greater rate of decisions. Financial news is primarily of two types: event-driven asynchronous announcements which are unscheduled or unexpected and regular synchronous announcements which program news that is anticipated by investors. The macroeconomic news is largely economic indicators from the key economies is extensively used in automated trading. They influence the biggest and most liquid markets. Tetlock (2007) threw light on the sentiment of news articles and showed that the segment of negative words in firm-specific news stories estimated low firm incomes. Barber and Odean (2008) examined the trading verdicts through investors' consideration that has been put forward by the news. A difference was made between professional investors and individual investors, where the latter are expected to buy shares on high-attention days. Professional investors are unlikely affected by such incidents, through the inequities in purchase and sell trades. Barber and Odean (2008) reported a specific diverse behavior of investors on stocks that came out in the news and those that did not. Moreover, inequities are created to be a negative return than positive return encompassing larger activities of trading throughout the times of declining stock prices. Tetlock (2007) is a pioneer in exploring news sentiment on stock market activity. Barber and Odean (2008) investigated the trading decisions made once investors' response has been held by the news, where the Dow Jones newsfeed is used as the dataset. It was examined that high-relevant news encourages an upsurge in market activity, with negative news sentiment having a bigger effect than positive news (Smales 2014; Klubmann and Hautsch 2011) .Sinha (2010) used readily affected sentiment scores to create a measure of long-term qualitative information to forecast returns. Their major results revealed an under the reaction of the stock market to news and momentum is described as the reason for this effect. Lillo et al. (2015) investigated the trading behavior of a huge set of single investors on sentiment analysis of the news. The trading activity of all the studied classes of investors is noticeably interrelated with both the flux of news and the daily volatility. A recent study

involved collecting news from the Lexis-Nexis database and filter for phrases that were dominantly used throughout the credit crisis and bank failures (Wisniewski and Lambe 2013). This work suggested that news might influence future market movements while there is only weak evidence that journalists replicate earlier news. Price et al. (1997) argued that the news framing effect has been influenced by the way how actions and problems are packaged and depicted by journalists to the public. They believed that news frames can affect the way readers understand these events and issues.

Internet postings are a theoretically valuable basis of a textual sentiment because several individuals spend a significant quantity of period of daily reading and writing internet postings about stocks. The message movements embrace theoretically valuable perceptions, manipulative behavior, market sentiment and responses to other sources of news. Das and Chen (2007) studied that probably a substantial effect is affected by financial markets. The Internet expressed sentiment is theoretically louder than corporation-expressed or media-expressed sentiment because it holds further opinions from individual dealers. This can create a theoretically influential basis from which to extract small investor sentiment. Though a large amount of these messages contain irrational or noise sentiment. Internet- posting sentiment has been studied by many researchers (Antweiler and Frank 2004; Das and Chen 2007; Chen et al. 2013). Antweiler and Frank (2004) analyzed internet stock message boards and measure the language by classifying the content as either purchase and sell or hold recommendations. Kim and Kim (2014) find that investor sentiment as expressed in posted messages has predictive power for stock volatility, returns, and volume of trade. They find out the confirmation that investor sentiment is positively affected by prior stock price performance and there is no substantial evidence that investor sentiment from Internet postings has predictive power for stock volatility and volume of trade. Chen and Chen (2018) studied that online news articles and financial blogs are highly influencing investor sentiment in the stock market through the perspective of behavioral finance. A shift from traditional trade over the phone to the online channel has been observed in the past decade (Barber and Odean 2000). Information technology increases the efficiency of the decision-making process and many

executives consider it a fundamental part of their business strategy (Molloy and Schwenk 1995; Bartholomew 1998). Stock transaction volumes are larger for stocks with a high number of searches on the internet (Bordino et al. 2014). The Internet has become an important source of information and investors have updated data which contribute to their decision making (Campbell 2001). Loewenstein et al. (2001) Furthermore, social interaction is getting affected by the prices in the financial market (Granovetter 2005). The Internet is the main sources of information in the financial markets about the security traded in the market, which leads to a creation of a greater rate of decisions, created on the massive sources by social interaction. In social networks or groups, various decisions are obtained from people in various collections, while a similar collection makes the same. Which means that the investor's decision making is affected by the participation of groups (Ozsoylev 2006). Social people interact more related to the investment will be benefited to the stock market investment (Hong et al. 2002). Ozsoylev (2006) said in a society of social networks, the people from different collections can result in decision variations among the group and people from the same collection make the decision the same. The decision making will be affected by the participation of group influences for an investor.

#### *2.5.3.4 Advocate recommendation*

Recommendations expert, interpersonal communications, and social interactions have high effects on the trading behavior of the investors (Shiller 1990; Shiller and Pound 1989). Social interaction also states to any consequence that another person or group has on one’s behavior and attitude. This outline is followed while making investment decisions where investors discuss stocks, interact and make decisions (Hirschey and Nofsinger, 2008). Krishnan and Booker (2002) examined influencing factors on the decisions of investors who used the recommendation of the analyst to arrive at short-term investment decision to sell or hold stock.

Advocate recommendation includes a recommendation from family member recommendation, friend's recommendation, brokerage houses and individual stock brokers. The investor who already holds a stock may react to an analyst recommendation in different ways such as the investor may sell stock or on a hold recommendation, the investor may hold stock on a sell recommendation, the investor may hold stock on a hold recommendation, or the investor may sell stock on a sell recommendation. Earlier accounting research has surveyed how the type of analyst and the nature of the analyst report affect investor behavior (Francis and Soffer 1997). The advocate recommendation factor includes factors like recommendations from a brokerage house, individual stockbroker and friend or coworkers (Nagy and Obenberger 2015)**.** Baker and Haslem (1974) find that the common stock investors mainly consider stockbrokers and advisory services as the main sources of information essential to make the stock selection decision. Shiller and Pound (1989) propose that individual investors find interpersonal communication as an important component of investor decisions. Also, this study finds that those who bought stocks with direct price rise tend to follow friends and relatives more compared to the stock broker's advice. According to Francis and Soffer (1997) "the existence of rewards for analysts to issue favorable recommendations, investors weigh other information in the analyst report more heavily when they observe a buy rather than a sell recommendation. This factor includes purchase recommendations from brokerage houses and individual stockbrokers". The large investors generate abnormal volumes of buyer-initiated trades after a positive recommendation only if the analyst is unaffiliated. Small traders put an abnormal buy pressure after all positive recommendations, including those of affiliated analysts. Krishnan and Booker (2002) analyzed the factors influencing the decisions of investors who use analysts' recommendations to arrive at a short-term decision to hold or sell a stock. The results indicate that a strong form of the analyst summary recommendation report, such as one with additional information supporting the analysts' position further, reduces the disposition error for gains and also reduces the disposition error for losses.

Aregbeyen and Mbadiugha (2011) in their study found that the most influencing factors on investor's decision in order of importance are future financial security, recommendations by reputable and trusted stockbrokers, awareness of the prospects of investing in shares, the composition of the board of directors of companies, motivation by people who have attained financial security through share investment, the recent financial performance of the company, management team of the company, ownership structure of the company, reputable predictions of future increment in share value and bonus payments. Nagy and Obenberger (2015) have suggested that classical wealth maximization criteria are significant to investors, even though investors employ diverse measures when choosing stocks. Modern concerns such as local or international operations, environmental track record and the firm's proper posture appear to be given only cursory consideration. The recommendations of brokerage houses, individual stockbrokers, family members, and co-workers go largely unattended. Many individual investors discount the benefits of valuation models when evaluating stocks. Gnani et al. (2012) found that accounting information factors are the high intensity towards affecting an investor's behavior and advocate recommendation have the least effect on investors' decision making. The variables accounting information, subjective or personal, neutral information, advocate recommendation, and personal financial needs. This study specified the factors that have significant influence and the factors that have the least influence on the Greek stock exchange investors. The research result showed that accounting information has significant and personal financial needs (Anna et al. 2004). The stock purchase decision is based upon the wealth maximization. Investors take family and friends recommendations as well as using accounting information but most of the investor's decision is based upon their own will and are not influenced by anyone. Individual investor lacks skills due to which the decision making of investors suffers (Iqbal and Usmani 2011). Krishnan and Booker (2002) considered the impact of analyst's recommendation on the proposition of investors to commit the error of disposition which is the sale of winning stocks at the earliest and the rearrangement of the sale of losing stocks. The study exposed that the presence of the recommendation report reduces the disposition error for gains but not for losses. The

disposition error for losses and gains is reduced only with more information justifying the position of the analysts. The Internet has not only provided means for electronic commerce but has also facilitated the sharing of information and knowledge with others. These are found in the form of chat rooms and discussion rooms where individuals can share their opinion on their subject of interest. In fact, this has turned out to be the biggest socializing media as one can share information with anyone across the world. In the financial market, factors such as expert's recommendations, earnings forecasts and information intermediaries can help investors in their decision-making process (Ke and Yu, 2009). Womack (1996); Barber et al. (2001) states that selling stocks with great unfavorable recommendations and buying stocks with the most favorable recommendations yields high returns to the investors. If the analysts attempting the optimism bias, then the accuracy of their forecasts by the frequent observation may be improved. Investor sentiment with the propensity to speculate pessimism or optimism about a stock and future stock returns varies depending on the difficulty of its valuation.

### 2.5.4 Macroeconomic factors

Prices of stocks and macroeconomic variables for developing and developing economies (Rahman and Mustafa 2008; Mukherjee and Naka 1995; Wongbampo and Sharma 2002; Maysami et al. 2004; Ratanapakorn and Sharma 2007; Asaolu and Ognumuyiwa 2011). These studies conclude that stock prices do respond to the changes in macroeconomic fundamentals but the sign and the causal relationship might not hold equal for all the studies. Moreover, Wickremasinghe (2011) examines the causal relationships between stock prices and macroeconomic variables using monthly data from the Sri Lanka stock exchange for the period 1985-2004. The results indicate that there are both short- and long-run causal relationships between stock prices and macroeconomic variables. Engle and Rangel (2008) find that stock market volatility is influenced by the volatility of three macroeconomic variables: inflation, interest rate and real GDP. Bhar and Maliaris (2011) examine whether the equity premium several variables that can be grouped into fundamental, behavioral and macroeconomic factors. They conclude that variables such as

unemployment, inflation, the dividend yield and the momentum play an important role. Mutuku and Ngeny (2015) examine the relationship between stock prices and four macroeconomic variables for the period 1997-2010. Their results suggest that the examined macroeconomic variables explain the behavior of stock prices in the long run. Besides the Index of Industrial Production (IIP), inflation and money supply, interest rate and exchange rate and term spread are the most used macro-economic factors to determine the stock returns.

Foreign Institutional Investment (FII) as defined by the European Union, "FII is the specific targets of risk, return, and maturity of claims are the particular investments in overseas stocks of the specialized finance intermediaries, who jointly manage savings on behalf of investors, particularly small investors". According to SEBI's, FIIs Currently involve foreign pension funds, mutual funds, university funds, asset management firms and other cash managers in a foreign stock market working on their behalf. Foreign institutional investment is a liquid nature investment that is a short-term investment, encouraging private people and institutional industrial investors to benefit from global diversification in portfolios. Investment in external investments relates to investments in a country's economic resources and manufacturing processes. FII is a short-term foreign institutional investment in other countries' economic markets. These institutions are generally investment companies, mutual funds, pension funds and insurance houses. In the development of resources required by the capital market, the FII plays a significant role. Also, in cases of inadequate resources from multilateral financial institutions and Foreign Direct Investment (FDI), they lead to the influx of foreign currency. According to Lalitha (1992), in the development of resources required by the capital market, the FII plays a significant role. Also, in cases of inadequate resources from multilateral financial institutions and FDI, they lead to the influx of foreign currency.

The interest rate is that any economy that directly relates to economic growth is a significant ingredient. In general, the interest rate is the cost of capital, the price paid for a certain period of moment about the use of funds. According to Kevin (2000), In the organized financial sector, interest rates are affected by monetary policy. However, prices

are not regulated for the unorganized economic industry and may fluctuate greatly depending on market demand and the provision of resources. An investor should assess further from the borrower's point of perspective, the rate of interest is the cost of borrowing cash (borrowing rates), the effects of interest rates level and development on the performance and profitability of businesses across economic industries. From the perspective of a lender, the interest rate is the loan charge (leasing rate). If the interest rate paid to the depositor by banks rises, the banks are deposited in their equity, leading in lower demand for stocks, which causes share prices to decline and vice versa. By contrast, the increase in the lending interest rate by the rate paid by the banks to depositors also leads to a reduction in investment in the economy. Maysami et al. (2004) explain that a rise in interest rates would render an inventory transaction more expensive when a considerable quantity of stock is borrowed cash explains, when a substantial amount of stocks is purchased with borrowed money, an increase in interest rate would make a stock transaction costlier. Investors expect greater pre-investment rates, which results in a decrease in demand and consequently a depreciation of prices. Time, default risk, inflation rate and capital productivity, among others, vary in the interest rate (Chandra 2004). Aydemir and Demirhan (2009) stated that economists have concerned the relationship between the share capitalization rate and the interest rate as they both play an important role in influencing the economic growth of a state. Interest rates theoretically adversely affect inventory market performance. The logic creating the adverse relationship between interest rates and share prices indicates that an upward interest rate trend increases the opportunity cost of keeping cash and thus replacing stocks and securities that lead to decreased inventory prices. Thus, a change in nominal interest rates should move asset prices in the opposite direction. According to French et al. (1987), “an increase in interest rates would avoid investors making high-risk stock market investments compared to low-risk interest-bearing security investments such as fixed deposits, savings certificates, treasury bills”. On the other hand, The central bank's change in interest rates indirectly would have an impact on stock market performance and spillover effects on the country's

general economic development. Therefore, determining the optimal rate of interest is a significant policy choice that must be taken frequently by a nation (Pallegedara 2012).

The impacts of inflation on an economy are different. They could have beneficial or negative impacts, and the impacts and complexities of the processes are the topics of intense discussion. This debate is motivated partially by the theory that the stock market provides an effective hedge against inflation, (Bodie 1976). Theoretically, inventory prices or returns should be positive for inflation, for the purposes that companies can spend the additional expenses on long-term clients even if the impact on demand varies to different degrees. But this policy cannot be efficiently accomplished in a brief term in a high inflation setting, as it also depends on the level of competition or market regulation that constrains individual companies from increasing prices to keep or boost their profitability. This demonstrates that if inflation increases, the adverse impacts of revenue owing to greater input expenses mean a short-term reduction in stock value. In the long run, the assumption is that companies are capable of transferring increasing expenses and achieving the required profitability

The exchange rate is the value of the currency of a nation to the value of the currency of another country. Therefore, there are two elements of an exchange rate, i.e. national monetary and foreign currencies. The cost of a foreign currency unit is expressed as the national currency in a straightforward quotation. The cost of the national currency unit is indicated as foreign currency in an indirect quotation. An exchange rate not recognized as a cross-currency, nor cross-government, as one of the two parts of the currency. For many reasons, exchange rates may fluctuate, including the macroeconomic variables that influence business participants ' behavior. Companies face an important risk source because the volatility of their realized money flows increases due to exchange rate changes. Three exchange rate kinds are established, such as nominal, actual and efficient exchange rates, and two extra exchange rates are recognized, namely, nominal exchange effective rates and balance exchange rates (Olisadebe 1991). Maysami et al. (2004) explain a rise in interest rates would cost the inventory transaction if a significant quantity of shares were bought with the cash borrowed. Before investing, investors expect a greater return rate,

resulting in a decrease in demand and therefore a depreciation in the cost. Inflation has an empirically blended effect on inventory prices (Fama 1981; Chen et al. 1986; Mukherjee and Naka 1995). According to Fama (1981) studied that The actual action is positively linked to stock yield but negatively linked to inflation through the hypothesis on cash supply, therefore, the stock yield will have inflation negatively impact. A dividend discount model can also explain the adverse connection between inflation and stock returns. Because an increase in inflation can be seen as the discounted value of the anticipated dividend, a nominal risk-free rate could improve and hence the discount rate leading to a decrease in inventory prices. However, the previous empirical studies also found a positive relationship between inflation and stock return (Ratanapakorn and Sharma, 2007) suggesting that equity acts as a hedge against inflation.

The inflation rate is the rate at which the price index increases. It is the price level percentage change over time. The rate of decline in cash purchasing power is about the same (Mishni 2004). An investigation into the impacts of inflation on the stock market was also carried out. The majority of academics used the Consumer Price Index (CPI) to replace inflation. CPI was commonly used to represent general government products and prices. Liljeblom et al. (1997) also found the Inflation impacted Finnish stock market data. As a proxy for inflation, the consumer price index is used. The connection between inflation and stock returns can be good or bad depending on whether the economy faces unexpected or anticipated inflation. Expected inflation occurs when demand exceeds supply, which causes price increases to boost supply. Because the enterprises expect this also, price increases would result in further payment of dividends and thus also an increase in the cost of their stocks. On the other side, unintended inflation will lead to price increases and shifting funds from investment to consumption. Price increases lead to higher living costs. Nominal interest rates will also rise as inflation rises. Consequently, the discount rate used to determine the stock's intrinsic values will rise, which would lower the current net income value resulting in reduced inventory prices. In the short term, between several days and just under a year, participants use the money market as a means of credit and lending. A rise in the interest rate will cause inventory prices to fall because the high-interest rate

increases the price of keeping cash, causing stocks to replace interest-bearing bonds. In the short run from several days until just under a year, participants use the money market as a means of borrowing and lending. A rise in the interest rate will lead to lower inventory prices as the high rate increases the price of keeping cash, thereby causing stocks replaced by interest-bearing bonds. An interest rate that has a direct relation to economic growth is one of the major macroeconomic factors. From the borrower's point of view, the interest rate is the cost of borrowing money whereas the interest rate is the profit from lending money from a borrower's point of view. Investment returns should be correlated negatively with the interest rate. Ngugi and Kabubo(1998) state the main function of the rate of interest is the mobilization of funding resources and the effective use of resources to foster economic growth and development. According to Chen et al. (1986) the systematic consequences of financial factors on bonds are the effects of financial force on the discount rates, companies' capacity to produce cash flows and future payments of dividends. The macroeconomic variables are a component of the risk factors in equity markets through this system. Vandana (2001) studied that macroeconomic inflation and interest rate factors affected the behavior of investors in variables by the strong Indian economy. Mark and Protopapadakis (2002) found that inflation and cash development are largely linked to the return on the inventory market. It was hard to identify the effect of actual macroeconomic factors on aggregate equity returns. Flannery and Protopapadakis (2002) have suggested several macroeconomic factors observed that can capture the risk premium impacts, in particular those that are consistent with cyclical movements due to the company cycle impacts. These variables include the gross national product development rate of the economy, the rate of inaction, the term spread between the government's long-term interest rates, the discount or interest rate factor, and the actual exchange rates. Mukherjee and Naka (1995) found that the dynamic association between the six macroeconomic variables and Japanese bonds, and the positive connection between industrial and inventory manufacturing. Mohammad et al. (2009) study the macro-economic variables ' role in explaining stock returns, like inflation, the interest rate and exchange rate. Exchange and interest rates seemed to be important concerning inventory income explanations and other

variables not vital. Pethe and Karnik (2000) study the relationship between the conduct of the stock market and macroeconomic factors. Maysami et al. (2004); Ahmed and Imam (2007) examine the relationships between Singapore and Bangladesh between the stock markets and various macroeconomic factors. There is a significant relationship established with all recognized macroeconomic factors in the Singapore bond index, on the other side, the macroeconomic impact on the stock price is not reflected in Bangladesh bonds. Chen et al. (1986) investigated that macroeconomic variables as a systematic influence on stock market returns. They found the variables of macroeconomic factors such as unanticipated inflation and industrial production anticipated, the yield spread between the long and short-term government bonds. Mukherjee and Naka (1995) found out that the relationship between stock market returns and macro-economic variables, it includes exchange rate, call money rate, money supply, industrial production index, inflation, the long-term government bond rate. They suggest that the stock market was integrated with the set of variables indicating a long-run equilibrium relationship between the return of stock market return and the macroeconomic variables. Zukarnain and Sofian (2012) suggested that the relationship between stock market volatility and five variables, namely GDP, exchange rate, inflation, interest rate, and money supply. They found that there exists a very weak relationship between macroeconomic volatilities and stock market volatility. Gan et al. (2006) studied that the relationships between the stock market index and a set of seven macroeconomic variables using Granger causality test and co-integration. This study analyses the long-run relationship between the stock market index and the macroeconomic variables. However, their results showed that the stock market was consistently determined by the real GDP, interest rate, and money supply. (Rahman and Mustafa 2008) suggested that macroeconomic determinants of stock market return for the Malaysian stock market by employing a Vector Error Correction Mechanism (VECM) and co-integration technique. This study mainly using monthly data ranged from January 1986 to March 2008, they found that interest rates, industrial production index, and reserves were positively related while exchange rate and money supply were inversely related to Malaysian stock market return in the long run. Akbar et al. (2012) suggested that the relationship between

the Karachi stock exchange index and macroeconomic variables for the period from January 1999 to June 2008. Employing a co-integration and VECM, they found that there is a long-run equilibrium relationship exists between the set of macroeconomic variables and the stock market index and. The results of this study indicated that stock prices were positively related to short-term interest rates and money supply and negatively related to foreign exchange reserve and inflation. This study the sample period from April 1992 to March 2001. The main findings indicated that there was no causal connection between stock returns and index of industrial production, money supply, foreign exchange reserve, real effective exchange rate, and trade balance. However, this study found a bi-directional causality between the rate of inflation and stock return (Bhattacharya and Mukherjee 2006). Pal and Mittal (2011) studied the relationship between the macroeconomic variables and Indian stock markets for the period January 1995 to December 2008 using quarterly data for the Johansen's co-integration framework. This study revealed that there was a long-run relationship exists between the stock market index and a set of macroeconomic variables. The results showed that inflation and exchange rate have a significant impact on BSE Sensex but the interest rate and Gross Domestic Saving (GDS) were insignificant. when an extensive amount of stocks are purchased with borrowed money, an increase in interest rate would make the stock transaction more costly. Investors will expect a higher rate of return before investing which results in the demand to fall and hence leads to price depreciation (Maysami et al. 2004). Fama (1981) observes a negative relationship between inflation and stock prices. Share prices are negatively impacted by inflation due to the negative correlation between inflation and expected real economic growth. Investors shift their portfolios toward real assets if the inflation rate becomes remarkably high (Hatemi 2009). Murungi (2012) examined the impact of inflation on stock market returns and volatility using OLS estimation and GARCH techniques on the Nairobi Securities Exchange. The study covered the period between July 2000 and August 2012. Findings from the study revealed a negative relationship between stock returns and inflation in Kenya. A change in the inflation rate had a significant negative effect on stock market volatility. Ochieng et al. (2012) suggested that the relationship between macro-economic

variables and stock market performance. The study found a weak positive relationship between inflation and stock market return using multiple regression. Ouma et al. (2014) studied the impact of macroeconomic variables on stock market returns in Kenya, using ordinary least squares and found that there was a positive relationship between inflation and stock prices. Ratanapakom and Sharma (2007) pointed out that the relationship between macroeconomic variables and stock prices, and find that stock prices were negatively related to inflation in the short run. The majority of empirical literature reviewed concerning the relationship between the inflation rate and stock market volatility show that the inflation rate affects share prices and may cause volatility of stock markets. Issahaku et al. (2013) studied the relationship between macro-economic variables and stock market returns and found a significant long-term relationship between the two variables. Ratanapakom and Sharma (2007) found a negative relationship between inflation and share prices while (Ochieng and Adhiambo; 2012 and Ouma et al. 2014) find that the inflation rate has a positive effect on share prices. Ambunya (2012) studied the relationship between exchange rate movement and stock market return volatility on the Nairobi securities exchange in Kenya, covering the period between 2001 and 2011. Using regression analysis, the study found that exchange rate movements greatly affected stock market return volatility and concluded that there is a strong relationship between exchange rate movement and stock market volatility in Kenya. Caner and Onder (2005), outline sources of stock market volatility as dividend yield, exchange rate, interest rate, inflation rate and movement of world market index. Abugri (2008); Caner and Oder (2005); Granger et al. (2000) identify inflation rate, interest rate, exchange rate, dividend yield, and money supply as notable factors influencing stock market volatility. Singh et al (2011) examined the cause and effect connection between the volatility of the foreign currency and inventory revenues. The results show a favorable connection and that the volatility of the foreign exchange rate affects the volatility of the stock exchange. Chaudhuri and Koo (2001) investigated the volatility of stock returns in emerging markets in terms of the volatility of domestic and external factors, found that both domestic macroeconomic variables and international variables have a significant impact on stock return volatility. Mukherjee and

Naka (1995) explored the relationship between exchange rate, inflation, money supply, real economic activity, long-term government bond rate and call money rate in the stock market. Fang and Lee (1990) studied the long-term relationships between stock return on the one hand and GNP, inflation and money supply on the stock market.

### 2.5.5 Investors' sentiment

Investor's sentiment is one of the important parts of behavioral finance. It can be described as the positive tendencies of an investor towards certain stocks which allow them to arbitrage across the price variations in the security market. It may include optimism, investor participation, and stock market outlook. There are three aspects of investors' sentiment likely investor optimism, investor participation, and an investor's stock market outlook. Investor optimism is the expectation of an investor that a positive event happens can happen in the market which is favorable to own. Investors always believe in their ability to choose better stocks than others. Investor's participation may be defined as successes are attributed to my skills and understanding. Investor's stock market outlook is like buy shares based on the company's past performance, to invest in a stock based on my expectation of market condition, a decision based on current market performance.

Investor sentiment has been defined as the theory of how an individual forms his belief about the market and securities' future prices. Individual investor's trading in the real world is significantly influenced by sentiment in comparison to institutional trading which usually depends on financial analysis. It is believed that individual investors are trading on noise, i.e. information which may not depend on fundamental facts, but on historical information or mainly attention-grabbing news. In the real world, individual investors are subject to biases in judgment and usually make similar mistakes and due to that inefficiency in the market may persist. Now, there is no question for the importance of individual investor's sentiment but to know how individual investor's sentiment is formed and which factors having a significant impact on it is important for academicians as well as practitioners to assess market efficiency. While some researchers may refer to investor sentiment as a propensity to trade on noise rather than information. Hengelbrock et al.

(2013) suggested that investor sentiment approaches have organized power for future stock returns. Market efficiency (Ngoc 2013) is the reflection in the market price fundamentals in the market characteristic and that excess returns in the long run. Baker et al. (2006) define investor sentiment as the opinions and beliefs of investors concerning future cash flows or discounts that the main fundamentals do not support. The trading of investors under mainstream models has a high degree of optimism or pessimism (Black 1986). Gao and Xu (2018) pointed out the relationship between investor sentiment on market return and trading behavior. The result shows that high investor sentiment and trading behavior are positively influenced behavioral return and sentiment return. Waweru et al. (2008) studied that changes in the price of stocks have an impact on their investment behavior. The factors affecting market effect variables are changes in price, market information, past trends of stocks, essentials of underlying stocks, preference of the customer, over-reaction to price changes. The association between the investor's decision making and sentiments factors has been under-explored in the Indian context. Most of the studies are mainly concentrated outside India (Bathia and Bredin 2013; Finter et al. 2010).

Investor sentiment means investors' attitudes and opinions toward investing. It mainly affects future cash flow and investment risk. It can lead to market bubbles and variation of price of a security in the market. Investor's opinions, attitudes, and decisions are mainly influenced by emotions, risk and future cash flows (Shu and Chang 2015) that investor sentiment can be affected by investment risk, returns, and emotions. Investor sentiment can be defined as an attitude concerning future cash flows and investment risks that are not defensible by the available information (Baker,2007). Mujtaba et al. (2012) find that the sentiment shifts the reaction of stock price to news towards sensation. Their results indicate that inventory price favorably reacts to the excellent news about revenue throughout elevated feeling over the low feeling period, and vice versa. In small, unstable, youthful, non-dividend paying and distressed inventories, this effect of sentiments is evident in the reaction to stock prices. Likewise (Ackert et al. 2015) founds that market reaction to earnings announcements is asymmetric, especially for pessimistic investor sentiment. Thorp (2004) found that sentiment describes the opinions, emotions or views

of expectations a group of people for the whole market. Investor sentiment is an approach to measure market sentiment. Behavioral finance searches the impact of investor sentiment in the stock market, and investor sentiment can help to explain the reason for correlating stock values poorly with pure fundamental financial analysis (Brown and Cliff 2004). Wang (2008) reported that survey data gives the first group of direct measures, whereas financial variables pave the indirect measures. According to Brown and Cliff (2004) sentiment represents the market participants' expectations relating to a norm and the investor's sentiments are classified into two; direct and indirect measures. Chang et al. (2015) also concluded that individual investors had stronger mis-reaction to information in times of high investor sentiment in the options market. Chuang and Lee (2006) say that overconfident investors are overreacting to private information, underestimate risk and trade more aggressively increasing overall market volatility. Lemmon and Portniaguina (2006) suggested that investor sentiment approximates the small stocks and stocks having low institutional Ownership of return. Tetlock (2007) found that investors' sentiment forecast low and high sentiment. Low sentiment will create downward price pressure and a high level of sentiment will create high volume. Investors' sentiment has mainly affected the cross-sectional relationship. They estimate that a minimum level of investors' sentiment has an effect on certain stock and the valuations are very high and the arbitration process is problematic (Baker and Wurgler 2006). Lemmon and Portniaguina (2006) studied that the assess confident investors using consumer confidence and to evaluate the connection between feelings and the small-scale bonus. They discover that the predicted variation in the value and dynamic premiums. Li and Zhang (2008) found that a favorable association between stock return and sentiment changes. Again, they discover that these changes are linked to market volatility negatively. Investor sentiment concept, the investors tend to decline into a predictable pattern of destructive investors i.e., they make mistakes every time. It includes sentimental factors affected by the ambiguity aversion of individual investors. Shleifer (2000) explains two major things in behavioral finance such as limited arbitrage and investors' sentiments. Investors sentiments are mainly concerned two things a) Representativeness Heuristic, i.e. the tendency of people to the thing as a

representative for some specific asset classes or process of probability and b) Conservatism Which indicate people to a slower modernizing the models in the face of new evidence that is essential. These two results are an overreaction and under the reaction of investors in stock markets. Investor's sentiments in a stock market defined the overall attitude toward the particular financial market or security. Sentiments influence the movements of the price of a security in the market if the bullish market rise in price and bearish market fall in prices. Investor's sentiments lead to believe about future cash flow and risk of the security. Sentiments of the market lead to overpriced and underpriced stock (Baker and Wurgler 2006). Guo et al. (2017) obtained investor sentiment information from China's professional social network websites, investment sentiment will be helpful when investors focus on such prices when they are predicting stock prices. Drakos (2010) found that significantly reduced returns in the event of terrorism assaults and activities Investigations of terrorist operations and investment sentiment. In a recent, (Rashid et al. 2013) analyze the impact on banking deposits of the investor's feeling. The researchers demonstrate that the sentiments index in Bursa Malaysia stock market in the longer term has a positive effect on deposit flows in Malaysian banks, by building an investment sentiment index using two attribute-based sentiment representatives. Partially, there are beneficial relationships between the first lag of sentiment representatives, production, money supply and interest rates and the currency has an adverse relation to banking deposits.

A growing number of empirical studies have found evidence of a significant relationship between investor sentiment and market returns (Brown and Cliff 2004; Baker and Wurgler 2007; Lee et al. 2002). The results show that individual investors are easily influenced by sentiment, and that sentiment influences the investors' decision-making process. Chi et al. (2012) study that investors sentiments and the relationship between return and volatility in the Chinese stock market, in this study, lack of experience and sentiments are highly influenced by the stock return. They found that high sentiments lead to high stock returns and low sentiments lead to a low return in the market. Schmeling (2009) explains the effect of the stock return of 18 countries using consumer confidence as a proxy of investor's

sentiments. The main conclusion of this study, when sentiment is high the stock return leads to lower and the sentiment is lower, stock return also tends to high. The result main categories of stock are the value of the stock, small stock, growth stock. (Baker and Wurgler 2007) suggested that two aspects of investor's sentiments proxies for two steps. The first approach, six indirect measure of investor's sentiments include the discount rate, share turnover, number, and first day IPO returns, equity shares in new issues, and dividend premium. The second approach, business cycle proxies includes growth in consumer durables, nondurables, and services, and recession variable. In this study sentiments effects on the predictability of stock return and volatility depend upon firm characteristics and demand. They developed two approaches such as top-down and macro-economic. In this approach, there are two assumptions in behavioral finance i.e. sentiment and limit to arbitrage. The top-down approach mainly focuses on the measurement of aggregate sentiments and the effect on stock market return. Stock prices are also depending upon the sentiments of investors. Sehgal et al (2009) study the relationship between investor sentiment and stock return. The main sentimental factors are market, economic and regulatory. This study mainly based on a survey of institutional investors and stock returns. Economic factors that impact investor sentiment are real GDP, corporate profits, the rate of inflation, level of interest rates and liquidity in the economy. market-based factors are a put-call ratio, advance-decline ratio, earning surprises and price to book value. The main findings are market return are highly influenced by the investor's sentiments. This study primarily concentrates the investor's behavior and stock market activity. Brown and Cliff (2004) study that direct and indirect measure of indicators of investor's sentiments. The direct measure is based on the survey report. In this study, direct and indirect measures are correlated and these indicators of sentiments are highly correlated to stock return. Chi et al. (2012) studied that high sentiments lead to high stock return and low sentiments leads to a low return in the market.

There are different models available for analysis of investor's sentiments, such as the qualitative approach and quantitative approach. The existing quantitative approach of investors sentiments measurement has mainly focused on time serious of price return,

trading volume, dividend premium, IPO volume volatility (Baker and Wurgler 2007) in the qualitative approach of investors are 2 types, rational arbitrage (sentiment free) and irrational investors. A behavioral model of investors risks created by the unpredictability of the investor's opinion (De Long et al. 1990). The sentiment means emotions, opinions, views, sums of a group of people expectations for the market (Thorp 2004). In the stock market, Investors' sentiment means attitude on specific financial security. It is the effect of the price movement's security in the financial market, whether the bullish market increase in price and a bearish market decrease in prices. Investor's sentiments lead to believe about the future cash flow and risk of the security and the market leads to under-priced stock overpriced and (Baker and Wurgler 2006). According to the psychology literature Sentiment means, individuals mainly affect their future events judgments and affecting their process of decision-making. In common, in the case of psychologies how people with positive sentiment make optimistic and pessimistic (Isen et al. 1988; Wright and Bower 1992; Bower 1981). Investor sentiment, whether it is their direct response to an announcement or after reading a news article, there was motivation to suggest that stock price movements would be related to such sentiment. Often these opinions do not translate into instant reactions but rather evaluated over time so that decisions could be made for the long term. Zhang (2008) defined Investor sentiment as market participants' opinions about future cash flows relative to some objective norm, namely the true fundamental value of the underlying asset. In their study, there are two possibilities for inaccurate opinions happen, individuals correctly use wrong information, or that they wrongly use correct information. In other words, sentimental investors may update their beliefs through the news about fundamentals in accumulation to noisy signals distinct to fundamentals and may do so in a statistically incorrect way. An investor decision making is based on comprehension and analysis of information. Every investor is guided by different sentiments (Hoffmann et al. 2015) studied the different sentiments of the investors which make them invest in certain portfolios. The outcome of the investment decisions is an important indicator of the position that an investor wants to take in security or investment. Individual investors' decisions on the securities exchange assume a critical part in deciding

market development, which then manages the economy (Kengatharan and Kengatharan 2014).

Investor sentiment states the overall attitude of investors toward the financial market. It represents the emotion, mood, confidence or anticipation of investors and may have an impact on their decision making. Sentiment could be induced by noisy information and limited trading experience. Baker and Wurgler (2006) find that investor sentiment has high effects on stocks whose valuations are mainly subjective and difficult to arbitrage. The results indicate that when beginning-of-period sentiment is high or low, subsequent returns are relatively low or high for small stocks, unprofitable stocks, young stocks, on-dividend-paying stocks, high volatility stocks, extreme growth stocks, and distressed stocks. This study also recommends that investor sentiment can also affect the cross-section of individual stocks. Stock prices reflect the discounted value of expected cash flows, and rational investors choose stocks based on their statistical properties, holding diversified mean-variance efficient portfolios (Markowitz 1959). Sentiments influence the movements of the price of a security in the market if bullish market there is a rise in price and bearish market fall in prices. Investor's sentiments lead to believe about future cash flow and risk of the security. Sentiments of the market lead to overpriced and under-priced stock (Baker and Wurgler, 2006). Lemmon and Portniaguina (2006) suggested that investor sentiment predict the returns of small stocks and stocks with low institutional ownership. Baker and Wurgler (2006) found that investor sentiment has larger effects on stocks whose valuations are highly subjective and difficult to arbitrage. Their results show that when beginning-of-period sentiment is low (high), subsequent returns are relatively high and low for small stocks, young stocks, high volatility stocks, unprofitable stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks. Hribar and McInnis (2012) find that those stocks receive optimistic earnings forecasts during such periods. They argue that, since difficult-to-value stocks are highly influenced by the trading activity of noise traders, the valuation of these stocks is considerably affected by investor sentiment. Lemmon and Portniaguina (2006) find that investor sentiment forecasts the returns of small stocks and stocks with low institutional ownership. These findings suggest that investor sentiment can

also affect the cross-section of individual stocks. Classical finance theory does not take into consideration investor sentiment. Stock prices reflect the discounted value of expected cash flows, and rational investors choose stocks based on their statistical properties, holding diversified mean-variance efficient portfolios (Markowitz 1959). However, the history of capital markets provides evidence of systematic patterns of mispricing where stocks deviate substantially from their fundamental value. This deviation, on the other hand, cannot be explained by the standard finance theory (Baker and Wurgler 2007).

According to (Baker and Wurgler 2006) "investor's sentiments in a stock market defined the overall attitude toward the particular financial market or security. Sentiments influence the movements of the price of a security in the market if the bullish market rise in price and bearish market fall in prices. Investor's sentiments lead to belief about future cash flow and risk of the security. Sentiments of the market lead to overpriced and underpriced stock". Bennet et al. (2012) suggest that the analysis of the investor's sentiment affects the market factors in the stock market. They studied in Ghana for 100 investors and selected for few market factors such as herd behavior, macro-economic factors, the internet led to access to information and trading, performance factor and confidence level of institutional investors, the best game in town, risk and cost factors. In this study investors, attitude influenced rumors, intuition, herd behavior and media coverage of the stock. There are different models available for analysis of investor's sentiments, such as the qualitative approach and quantitative approach. The existing quantitative approach of investors sentiments measurement has mainly focused on time serious of price return, trading volume, dividend premium, IPO volume volatility (Baker and Wurgler 2007). In the qualitative approach of investors are 2 types, rational arbitrage or sentiment free and irrational investors. A behavioral model of investors risks created by the unpredictability of the investor's opinion (De Long et al. 1990).

Overall, the present literature shows that investor sentiment is a dynamic component in the formation of stock prices. It also affects the cross-section of stock returns. Some stocks are more prone to changes in investor sentiment than the others, depending on the firms' characteristics such as market capitalization, price multiples, and ownership concentration.

Brown and Cliff (2004) constructed a direct measure of the sentiment using surveys and also tested if this direct measure is related to more objective indirect measures. In their research, two different types of surveys are used, as they split their sample into individual investors and institutional investors. The first one is the survey of the American Association of Individual Investors (AAII) as a measure of individual investor sentiment which asks participants what they expect of the stock market in the next 6 months (up, down or the same). The second survey focuses on institutional investors which is the survey of Investors Intelligence. They find these direct measures of sentiment are very much related to more indirect measures which are used as proxies to see if speculators in the market are bullish or bearish. Indirect measures that are used are the recent stock performance, margin borrowing such as in theory bullish investors are willing to use borrowed money, and some derivatives variables which can also indicate whether an investor is bullish or bearish. The high correlation between these variables and the direct measures of sentiment indicate the surveys are a good measure of sentiment (Brown and Cliff 2004). In their research, sentiment can be predicted by looking at stock returns, but it does not work the other way around. In their research it is shown stock returns can only be predicted for the short run by looking at investor's sentiment.

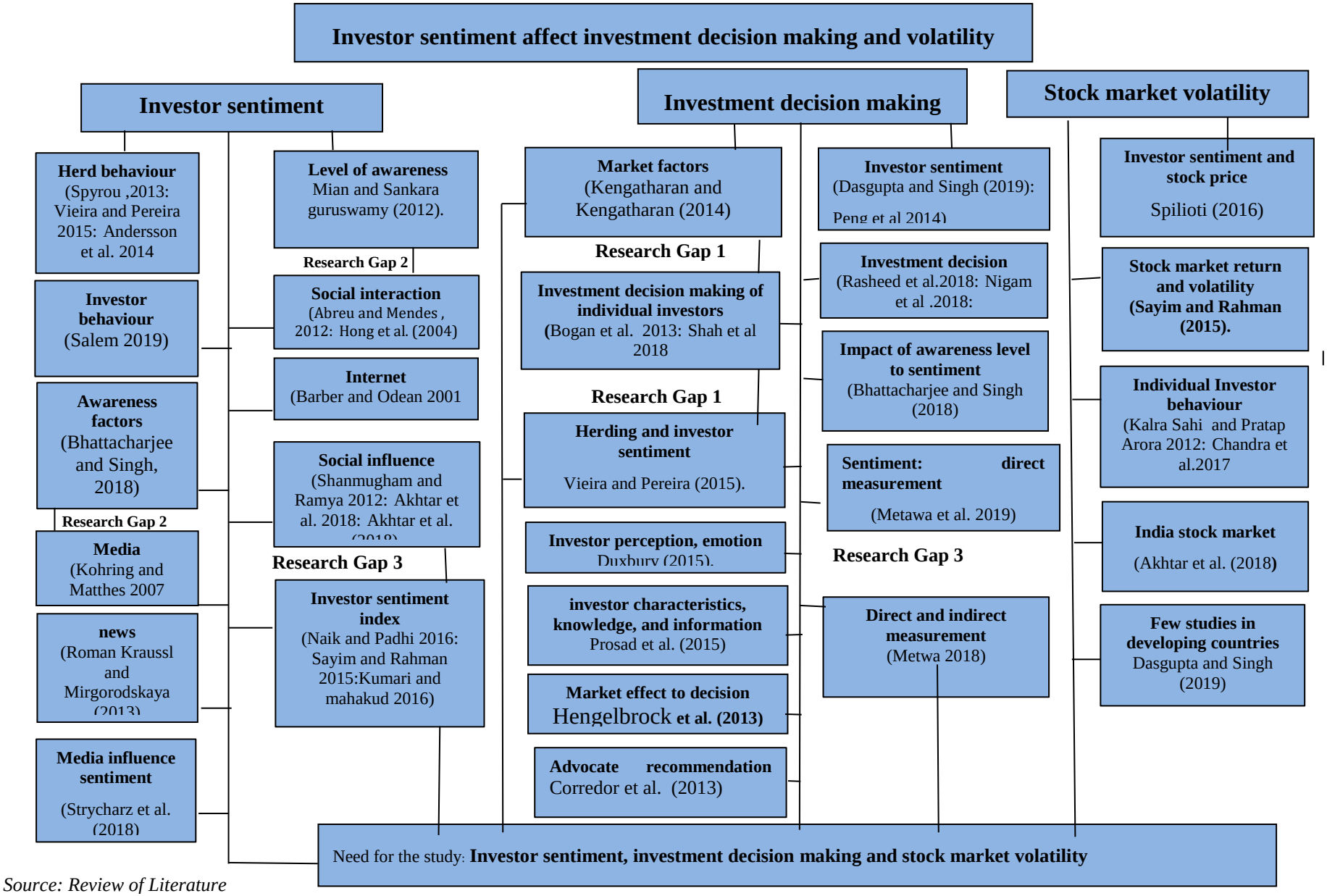
In behavioral finance literature, there are two measures of investor sentiment. A direct measure founded on surveys and an indirect measure constructed with the use of market data. Investor's sentiment means attitude and opinion about future cash operations and the number of funds in investing in the different types of securities. Investors tend to decline into a predictable pattern of destructive investors i.e., they make mistakes every time. It includes sentimental factors affected by the ambiguity aversion of individual investors. Empirical evidence in the behavioral finance literature shows that individuals do not behave rationally. Barberis and Thaler (2003) provide a good summary of models that try to explain the equity premium puzzle, excessive trading, excess volatility, and stock return predictability using both the Prospect Theory of Kahneman and Tversky (1979). Daniel et al. (2002) support the view that markets are not efficient and investor biases affect security prices substantially. De Long et al. (1990); Barberis et al. (1997); Bikhchandani et al.

(2002) find that investors are not rational or markets may not be efficient and prices may importantly deviate from fundamental values due to occurrence of irrational investors. This study is important for investors for two main reasons. First, it teaches one about the biases of investors in the stock markets, and how investors make decisions while holding these biases. Neal and Wheatley (1998) analyze the predicting power of sentiment and find that sentiment can predict returns. Lee et al. (2002) find that investor sentiment is a systematic risk factor and priced into the market. Kumar (2007) study the trading patterns of retail traders. Baker et al. (2012) examine the relationship between investor sentiment and cross-section of stock returns as well as the return on government bonds. Verma and Verma (2008) empirically examine the relationship between sentiment and volatility in the conditional mean and variance.

The above factors lead to certain investment sentiments which leads to investors' decision making. This section highlighted the gradual shift of economists ' attitudes to human decision-making from the rational to the irrational, particularly in investment aspects. The section also describes the growth of behavior finance that concentrated more on group behavior, and how psychology was focused on individuals. The chapter also talks about the various aspects of investment behavior and evolution. The demographic and psychographic factors which impact investments have also been highlighted through the findings of various previous researches. Particularly, the various studies performed with a focus on Indian individual investors have been highlighted.

### 2.6 Literature-Map

The extensive literature review on the variable identified for the study enabled the researcher the relationship between the variable and also reveals the research gap. The literature map shows that a research gap exists in analyzing the effects of investor sentiment and investment decision making of the Indian stock market**.**




*Source: Review of Literature*

**Figure 2. 3 Literature Survey Map**

## 2.7 Research Gap

### Research gap 1:

There has been increasing attention among the researchers towards the concept of investor sentiment and its antecedents. As mentioned earlier in the literature review, an incredible amount of studies (Bernasek and Bajtelsmit 1996; Jamshidinavid et al. 2012; Waweru et al. 2008) have focused on exploring the predictive effects of socio-economic factors on decision making among equity investors in the stock market. Hirshleifer and Teoh (2003) agree that people, through their behavior and activities, influence the views and conduct of decision making among individuals. There are very few studies that considered the effect of investors' sentiment on investment decision making in the Indian context (Burghardt et al. 2011). Similarly, various antecedents of investor sentiment are not investigated in detail in the existing literature (Baker et al., 2012; Huang et al., 2014). There have been very few attempts in the Indian context and most of the studies are in foreign countries (Chen et al., 2010; Corredor et al. 2013).

Hence, there is a need to incorporate various determinants within a single theoretical model to study their influence on investors'' sentiments and investment decision making in the equity market. Thus the present study is trying to fill this gap by adding the antecedents of investors' sentiments, such as, herd behavior, market effect and awareness factors in a single model to study the investment decision making by individual investors in the Indian stock market.

### Research gap 2:

Previous studies state awareness effect as an important component of investors' decision making. Investment decision making is a complex task because of the uncertain situations. The complexity of financial instruments and the absence of economic capacity among people accessible for data, that was why investing in assets are not isolated. Individuals increase awareness by observing the behavior of others or collecting information by talking to family members or social circles and by different sources of awareness like media and

internet ( Hirshleifer and Teoh 2003; Konig 2010). Past studies found that there is a lack of awareness among stock market investors while investing in the stock market (Lusardi and Mitchell 2008; Hilgert et al. 2003). Few research studies (Takeda et al. 2013) have investigated the influence of investors awareness factors on investor sentiments and decision making of the investors. Since in India stock price variation always upward and downward, Sometime it may be high and low.

Media, social interactions and the internet are vital modes for sharing information and knowledge. The media is one of the main factors influencing investors' decisions. Indeed, the media and internet play a key role in sharing information about market movements and forecasts of market movements (Shiller 2000; Davis 2006). It is also stated that the media influence investor from the formal assessment of investments (Baker and Nofsinger 2002). Kraussl and Mirgorodskaya (2014) investigate the impact of news and media on financial market returns and price variation in the long-term. Based on the earlier research, very few studies have focused on awareness effect, which is an essential component of equity market investor decision-making. Furthermore, investigating the investment decision of stock market investors is a necessity for successful investment strategies. Awareness factors could include media, social interaction, recommendation from family members or brokers and internet (Akhtar et al. 2018). Very few studies have focused on how various awareness factors influences individuals' investor sentiment and investment decision making. Especially, the effect of various awareness factors on investors' sentiments has not been addressed widely in a single framework. Hence this study incorporated various awareness factors to predict investors sentiment and decision making.

**Research Gap 3:**

The literature on behavioral finance focus on measuring investment sentiment and its effect on the stock market return and investment decision making. The stock market is made up of several participants who interact with each other and with society at large. Therefore, the collective level of optimism or pessimism in society could impact investor decisions (Loewenstein et al. 2001). Investor sentiment could be measured either via survey method

(Bennet 2012) or via investor sentiment index (Baker 2006). Previous studies (Baker and Wurgler 2006; Chen et al. 2010) have constructed an Investor sentiment index mainly for the USA from secondary information. Sentiment influence the price movement of a security in the market, whether the bearish market fall in prices and bullish market rise in price and it leads to the belief about the risk of the security and future cash flow. Baker and Wurgler (2006) suggested that investor sentiment is the tendency to speculate the pessimism and optimism about stock and state that investor sentiment has a high influence on volatile, young, small and non-dividend payers. Most of the studies focus on either the survey method or the market-based sentiment estimation method. Studies fail to bring a comprehensive framework by incorporating both of these methods. These studies try to incorporate primary and market-based methodology to solve this issue

**Research Gap 4:**

Investor sentiment is considered as one of the determined of the stock market volatility, but the phenomenon has not been widely explored in the dynamic Indian scenario. Merikas and Prasad (2003) found that individuals make investment decisions based on the fluctuations in price index with special focused on the recent price changes and current economic indicators. The literature suggests that investor sentiment is a systematic factor that has explanatory power to explain future stock returns. There are only a few studies that constructed the investor sentiment index for analyzing the relationship between investor sentiment and market volatility (Kumari and Mahakud 2016). Earlier studies focused on the role of market sentiment by neglecting the investor sentiment and its impact on market volatility. Therefore, this study investigates the impact of investor sentiment on market volatility.

## 2.8 Conceptual Framework

The researcher has attempted to draw a conceptual framework based on the literature review and the subsequent generation of the literature map. The conceptual framework highlights the relationship between the independent and dependent variables. Based on the

literature review, the conceptual model for the study was developed as shown in Figure 2.4 This model conceptualizes the factors which are influencing investors' sentiment and the decision making of individual investors as the dependent variable. The independent variable includes herd behavior, market factors, awareness factors like media, internet, social interaction, and advocate recommendation and the dependent variable is investment decision making.

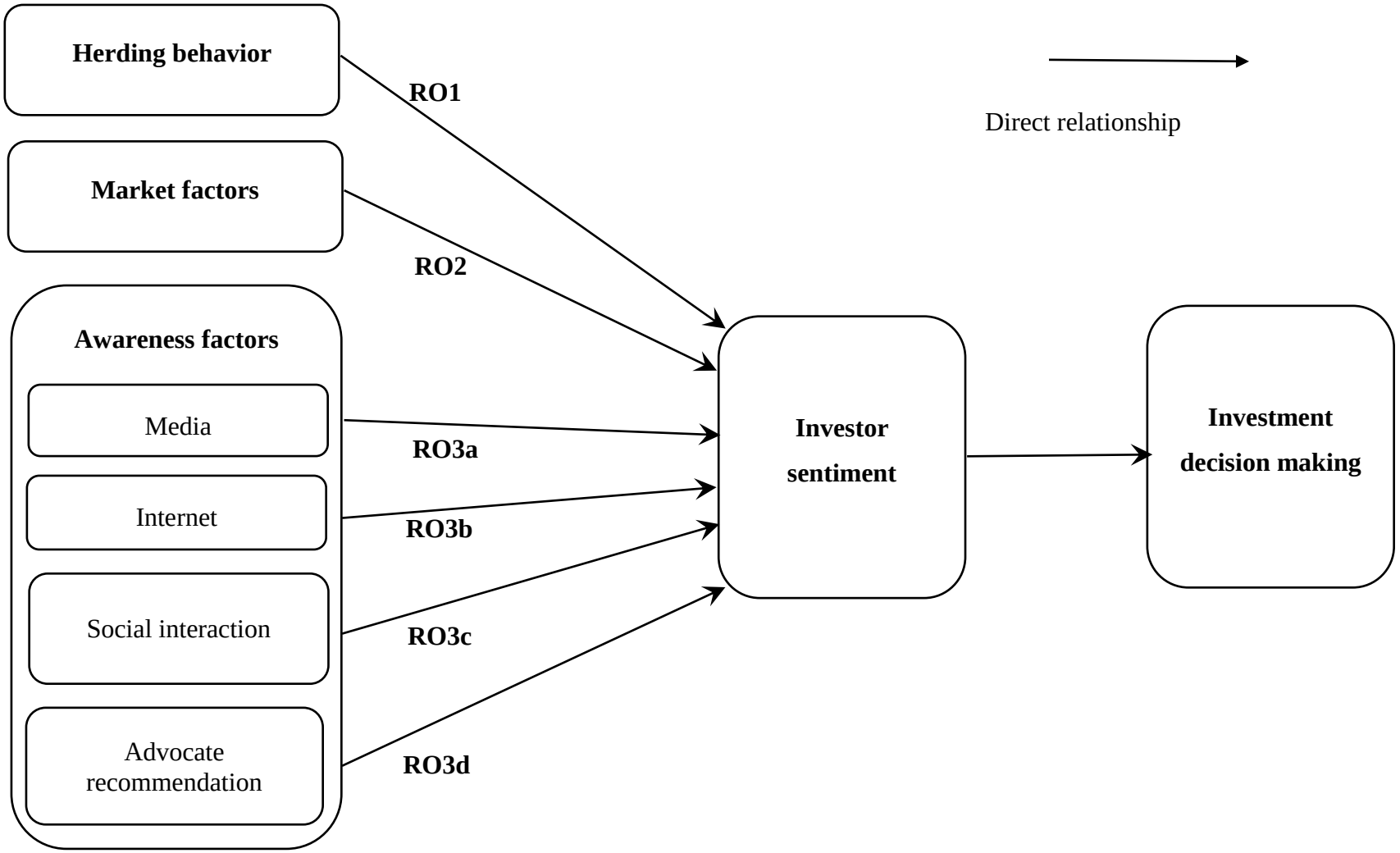



**Figure 2. 4 Conceptual model Assessment of the impact of investors' sentiments and investment decision making of individual investors**

*Source: literature review*

## 2.9 Operational Definition of the Variables

An operational definition is a specific way of measuring a variable in a specific study. The need for operational definitions is essential when collecting all types of data. The research recognized the following variables from the literature review and given an operational definition of the factors (Table 2.1).

**Table 2. 1: Operational definition of the variables**

| Study Variables | Operational Definition |
|---|---|
| 1. **Investors' sentiment** | It can be described as the positive tendencies of an investor towards certain stocks which allow them to arbitrage across the price variations in the security market. It may include optimism, investor participation, and stock market outlook. |
| 2. **Market factor** | It can be defined as factors such as price change, market information, the past trend of the stock, fundamentals of the underlying stock, customer preference, overreaction of price changes that predict the decision making and future behavior of *individual* investors. |
| 3. **Herd behavior** | Herding means similar thinking among individuals. It describes, if any experienced investors invest in any stock, others will follow the same category of investment. |
| 4. **Awareness effect** | It comprises all recommendations or advice given by family, internet, magazine friends, brokerage houses etc. which may lead a particular investor to sell, buy or hold security in a stock market. |
| 5. **Individual investors** | Individuals who buy and sell the quantities of securities for investment in the stock market. |
| 6. **Stock market Volatility** | It is a rate at which the price of a security increases or decreases for a given set of returns. That means the degree of variation of a trading price over a series of time. Volatility is the amount of uncertainty or risk about the changes in a security's value. |

| | | |
|---|---|---|
| 7. | **Investment decision making** | It can be defined as the decision making taken by individual retail investors while investing in the stock market |

*Source: Review of literature*

The study has six variables, in that independent variables, are herding behavior, market factors awareness factors such as media, internet, social interaction and advocate recommendation. Dependent variables are investor sentiment and investment decision making.

## 2.10 SUMMARY

This chapter is an extensive review of the available literature in the field of investor sentiment that leads to investment decision making. In addition to the variable listed, an elaborate literature review was also conducted on certain other variables, which were thought to have a bearing on the main variables. The literature review enabled the researcher to draw a literature map, that highlighted the important studies that were conducted and also to identify the research gap. Four research gaps have been identified which have been termed as the need for the study in the literature map. The conceptual framework also has been constructed based on the literature review and literature map. The literature review enabled the researcher to conceptualize the research design and methodology required for the study which is detailed in the subsequent chapter.

# CHAPTER 3

# RESEARCH METHODOLOGY

## 3.1 Chapter overview

The previous chapter discusses the review of the literature and the theoretical framework helped to define and understand the process and components of investment behavior. This chapter details the research methodology adopted for the study and is organized into the following sections. Section 3.2 research design followed by section 3.3 research approach adopted and section 3.4 data sources. Section 3.5 presents a research instrument and section 3.6 pilot study. Section 3.7 gives the sampling followed by section 3.8 sampling method. Section 3.9 mentioned the sampling frame. Section 3.10 sample size calculation with section 3.11 which gives the statistical analysis. Section 3.12 deals with a summary of the chapter.

## 3.2 Research design

Research designs refer to the logical structure of the inquiry and must be consistent with the reality that is being researched. The research design is a link between the objectives established and the conduct of the study. Quantitative research methods are used for the study in answering the research questions. The present study uses quantitative research methods to strengthen the reliability and validity of the research. Research methods usually involve collecting and converting data into numerical form so that statistical calculations can be made and conclusions are drawn. In the quantitative method, research is inferential. The study adopts the survey method to collect primary data collected using self-administered questionnaires from Indian individual investors spread across the major cities in India, and databases to infer characteristics or relationships of the population. A well-formulated research design provides a clear path to the achievement of the objectives, the

data to be collected and for the analysis as well as interpretation of the data. The current study is on the impact of investor sentiment and investment decision making.

### 3.2.1 Descriptive Approach

The study is descriptive, where it provides answers to the questions of who, what, when, where, and how associated with a particular research problem. Descriptive research was used in the study to make descriptions of the phenomena and characteristics associated with the sample. To analyze the research problem undertaken for the study, a descriptive study using primary data is considered appropriate. Descriptive research aims to verify formulated hypotheses that refer to the present situation. The descriptive approach is quick and practical in terms of the financial aspect. Moreover, this method allows a flexible approach, thus, when important new issues and questions arise during the duration of the study, further investigation may be conducted.

The study, tried to understand the investors herding behavior, market factors and awareness factors among different demographic groups. The descriptive study requires describing concepts under study in real situations, and the study provides a complete description of market factors, herding behavior, and awareness factors that influence the investors' sentiment and decision making. The detailed descriptive study of the above factors would lead to the development of the model of the investors' sentiments of decision making in the equity market.

## 3.3 Research Approach

The research approach or research theory includes the Deductive approach and the Inductive approach. The deductive approach involves developing hypotheses or theories and is to be used for scientific research (Saunders et al. 2009). According to Saunders et al. (2009) "Deductive approach owes more to positivism and Inductive to interpretivism". Since the data collection and analysis in this work is more inclined to both mixed method research is used. The research is inductive since the researcher initiates with the theory on

investor sentiment and investment decision making to establish the relationship between investor sentiment and the decision making of the individual investors. Before the collection of data, a clear theoretical view was created, and so the study is based on a deductive strategy. First, the relationship among investor sentiment and its theory was deduced from the hypothesis. Second, hypotheses on how the investor sentiment and its variables were measured have been explained operationally, proposing a relationship between two specific factors. Third, these hypotheses were empirically tested. Fourth, it verified the hypothesis and suggested a few changes by examining the results of the investigation. Fifth, in light of the findings, the theory was modified. The deductive argument was used for testing investor sentiment theories and generalizing and replicating research results. Therefore, the research uses inductive and inductive arguments, beginning with a theoretical structure that formulates hypotheses and logically derives from the study results.

### 3.4 Sources of data

A survey approach was adopted using a structured questionnaire. Where possible, the questionnaire was administered directly (face-to-face) and was not possible, it was administered indirectly (through a telephonic survey). While distributing the questionnaire, the purpose of the survey was explained to each respondent and on obtaining consent, the respondents were asked to fill out the questionnaire.

Data sources are classified as being either primary sources or secondary sources. The primary data sources were the main information sources. To address the research problem, primary data have been collected. The main data from this study are the quantitative nature of the study. The study design was used to describe the patterns, attitudes and views of individual investors quantitatively. All information relating to factors like herd behavior, market effect, awareness factors and investor sentiment. the individual investor has taken for the population of the study. A source is primary if the data collector is the one using

the data for analysis. It is collected primarily through a survey in the form of a self-administered questionnaire that was developed by the researcher based on the literature review on the relevant topics.

Secondary data study obtains monthly macroeconomic data from the RBI's Database on Indian Economy (a database of the Reserve Bank of India; http://www.dbie.rbi.org.in), NSE Nifty to represent aggregate market returns. The Sentiment Index data is received from the Data zone of the official website of the Reserve Bank of India and National Stock Exchange of India and SEBI. The stock market volatility index employed as price volatility in the market specifically, it uses the India volatility index. The monthly data spans from January 2000 to December 2016. This section, elaborates on the choice of investor sentiment indicators to construct an irrational aggregate sentiment index. The study uses primary and secondary data sources to study the influence of investors' sentiments on individual investors' decision-making and stock market volatility. The analysis of secondary data has been discussed in chapter 5. The researcher has examined the data to find the linkage between the research objective and outcomes concerning the research questions. Moreover, information is collected from existing literature on the herd, market factors, and awareness factors.

### 3.5 Research Instrument

The research instrument chosen for the study consists of a structured questionnaire which was prepared based on a literature review. A formal questionnaire was prepared following a structured data collection process. Cooperation between respondents is enhanced in self-administered questionnaires when most questions are structured (Malhotra and Birks, 2007). A questionnaire is an instrument that allows the researcher to access a maximum number of respondents which results in generating a vast amount of data for descriptive studies. A range of views regarding behavior, intentions, attitudes, knowledge, motivations and demographic characteristics were asked to the respondents. The questions on the

variable namely herding, market, awareness and decision making are measured using a five-point Likert scale. The level of agreement ranges from strongly disagree, disagree, slightly disagree, neutral, agree, strongly agree. The questionnaire was structured as follows: the first section includes questions related to the demographic profile of the respondents, the second section of the questionnaire includes the questions related to herd behavior, market factors, awareness factors, investors sentiment for measuring investment decision making.

### 3.5.1. Questionnaire Development

The questionnaire is a widely used and useful instrument for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straight forward to analyze (Wilson et al. 1994). The questionnaire for the study was carefully designed to meet the requirements of the research. Concerning questions and wordings, all the questions were designed to be short, simple and comprehensible, avoiding ambiguous, vague, and leading double-barreled and presumptuous questions. Negatively worded questions were avoided to prevent confusion to respondents in answering the questions. The questionnaire used in the study is attached in Appendix 1. The questionnaire has been divided into two parts. The first part of the questionnaire consists of demographic information of individual investors related to an equity investment in the stock market. The second part deals with questions related to factors that are influencing investor sentiment and investment decision making among individual investors.

### 3.5.2. Scale development

The Likert scale is by far the most popular attitude scale used in the questionnaire to obtain the participants or degree of agreement with a set of the statement (Babbie 2015). A statement is followed by several levels of agreement: strongly disagree, disagree, neutral, and strongly agree. This five-point scale is commonly used, but other scales from four to

ten points can be used as well (Mueller,1986). The investor sentiment questionnaire consists of investor optimism, participation and stock market outlook adapted from Shiller and Pound (1989); Singhvi (2001). The total number of 11 items of which some have been developed by the researcher, through an extensive literature review, research objective, and research hypothesis. Herd behavior scale (Bikhchandani and Sharma 2000; Nofsinger and Sias 1999). Media scale developed by Nofsinger and Richard (2002); Shiller (2000); Davis et al. (2006) and Barber and Odean (2008) social interaction scale adapted from Ramya and Shanmugham (2011) and the Advocate recommendation scale adapted from (Nagy and Obenberger 1994; Merikas and Prasad 2003; Al-Tamimi 2006). The major variables of the study:

**Table 3. 1 List of variable and level of measurement**

| SI No | Variable | Nature of variable | Level of measurement |
|---|---|---|---|
| **1** | Gender | Categorical | Nominal |
| **2** | Age | Categorical | Ordinal |
| **3** | Marital Status | Categorical | Nominal |
| **4** | Educational Level | Categorical | Ordinal |
| **5** | Occupation | Categorical | Ordinal |
| **6** | Annual Income | Categorical | Ordinal |
| **7** | Year of experience | Categorical | Ordinal |
| **8** | Herd behavior | Continuous | Interval |
| **9** | Market factors | Continuous | Interval |
| **10** | Media | Continuous | Interval |
| **11** | Internet | Continuous | Interval |
| **12** | Social interaction | Continuous | Interval |
| **13** | Advocate recommendation | Continuous | Interval |
| **14** | Investor sentiment | Continuous | Interval |
| **15** | Investment decision making | Continuous | Interval |

*Sources: Review of literature*

**Table 3. 2 Items Used in the Research Study**

| Variables | Authors | Scale items |
|---|---|---|
| **Market factors** | Waweru et al. (2008) | **6** |
| **Herd behavior** | (Lakonishok et al. 1992): Scharfstein and Stein (1990); Menkhoff et al. (2006); Christie and Huang (1995) | **6** |
| **Internet** | Shiller(2000);Baber and Odean(2001) | **5** |
| **Social interaction** | Shanmugham and Ramya (2012); Abreu and Mendes (2012) and Hong et al. (2004) | **5** |
| **Media:** | Nofsinger (2002); Shiller (2000); Davis (2006), Baberandodean (2008); Shanmugham and Ramya (2012); Abreu and Mendes (2012); and Hong et al. (2004) | **5** |
| **Advocate recommendation** | Krishnan and Booker (2002) | **5** |
| **Investors sentiment** | Shiller (2000) ; Vandhana Sighvi (2001) | **11** |
| **Decision making** | Mann et al. (1997) | **6** |

*Source: Literature Review*

### 3.6 Pilot Study

The pilot study allows the researcher to identify if respondents can understand the questions or there is a chance that respondents might not answer (Bryman and Bell 2015). Pilot testing was done with 50 individual investors initially surveyed. Based on the pre-test results a few questions which were difficult to extract information from the respondents were modified and kept ready for the data collection process. The main purpose of the pilot study was to ascertain the content validity and reliability. Minor changes to wording, language, and structure of the questionnaire were incorporated, based on the findings from the pilot study. An initial level of reliability analysis was also done with the data collected from the pilot study. The latent variables had acceptable reliability (Cronbach Alpha >0.7) at this stage. Modifications were made to the wordings and layout of the questionnaire from the feedback received from the respondents. The final version of the questionnaire is in Appendix 1 of this study.

The survey questionnaire was administered by two major modes – online and offline. the online survey was conducted via the internet and email. In the case of the offline method, the questionnaire was mailed to potential respondents, which consisted of a cover letter, questionnaire and return envelope.

### 3.7 Sampling

Sampling is a process of selecting samples from a group or population to become the foundation for estimating and predicting the outcome of the population

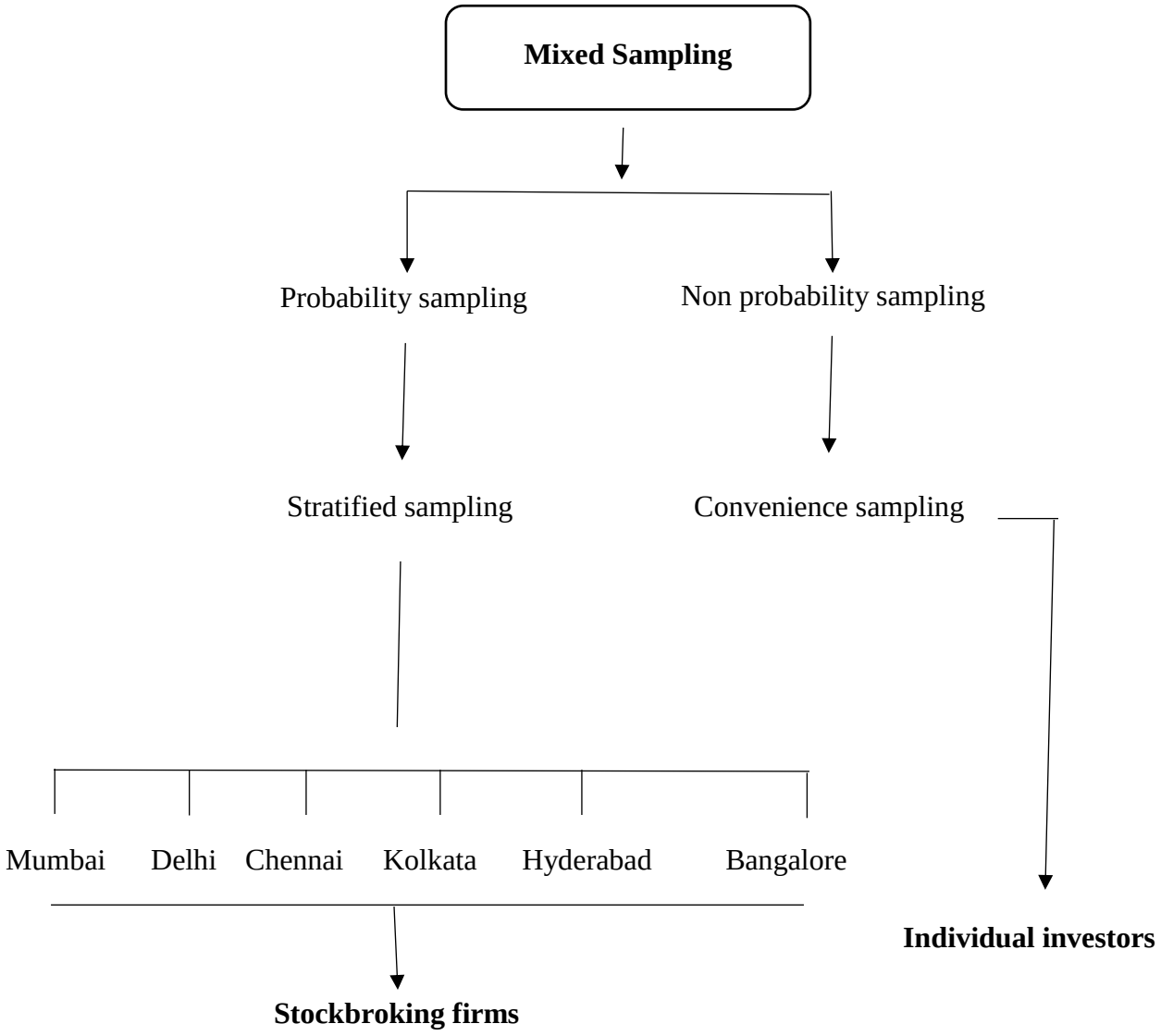



**Figure 3. 2 Sampling Flowchart**

*Sources: Review of literature*

### 3.8 Sampling methods or techniques

The sampling method selected for the study is mixed method sampling which is the combination of probability and non-probability methods of sampling. To choose the countries from which participants were taken, probability sampling was used among the various method of sampling. This method is most often related to survey-based studies in which the samples of a population can be inferred to achieve the study objectives. Under probability sampling, the stratified random sampling method is adopted for the study. The sample taken from each stratum is proportional to the relative size of that stratum in the overall population concerning a proportionate stratified sample. Stratified random sampling improves accuracy without increasing the cost (Malhotra and dash 2011). Here the population is divided into subpopulations or strata, making the sample more representative. The stratification was based on the highest capital turnover cities in India. on the highest capital turnover cities were classified into four strata (Table 3.3).

### 3.9 Sampling Frame

The sampling frame considered in this first stage would be the stockbroking firms in the major metro cities (According to NSE fact file report, 2015) of India. The sampling frame is the list of all units of the population which can contribute to the research. Thus, the sample drawn from the sample frame was the stockbroking firms from major metro cities. This allows better generalization and increases the representation of the overall population. The respondents under this study being equity investors while investing in the stock market. The second stage of non-probabilistic sampling was employed. A later stage incorporates a non-probability method of convenience sampling method is employed. While selecting the respondent which is most appropriate for the study. A structured questionnaire is employed to collect quantitative data. Thus, a combination of both stratified sampling and convenience sampling was followed in the study. Initially, stratified sampling was considered for determining the sample of stockbroking firms. It was followed

by convenience sampling method for choosing the respondents to whom the questionnaire would be distributed and from whom the data would be collected for analysis.

The population of the current study is 7669 (SEBI Registered stockbrokers in the equity segment report 2016). The study proposes to use the major metro cities (NSE fact file 2015) for the sampling frame. The NSE Fact File 2015 also identifies that among the major cities, Mumbai has the highest number of equity investors (60.5 percent), so the highest number of stockbroking firm is considered from Mumbai (Table 3.4). A convenience sampling is proposed to be conducted for selecting the 366 stockbroking firms from the major metro cities. It is proposed to administer a questionnaire to 2 investors from each stockbroking firm. So the total number of respondents estimated for the study is 732.

### 3.10 Sample size calculation

The sample size was calculated using the sample size calculator and was found to be 366. The sampling frame was divided into various strata based on the list of major metro cities. The number of stockbrokers considered from each strata was calculated. The proportion of choosing stockbrokers from each strata was decided using the stock market turn over from these cities based on (NSE fact file 2015). Hence as shown in Table 3.4. 222 stockbroking firms were to choose from Mumbai, 80 were to be taken from Delhi,35 from Chennai, and 29 chosen from Kolkata.

N=7669 e = 0.05

$$n = \frac{N}{1 + N(e)^2}$$ (Slovin 1960)

From the 366 samples obtained from the sample-size calculator, which is divided among the cities having the highest percentage of capital market turnover (NSE fact file) from each brokerage firm 2 respondents will be approaches to answer this questionnaire.

To determine the sample size, the Sample Size Calculator is used. At a confidence level of 95% and a confidence interval of 5, which is generally accepted for Social Sciences (Cohen

1988). The sample size affects how the sample findings accurately represent the population (Burns and Bush 2010). The larger the sample is, the more likely that the generalizations are an accurate reflection of the population (Saunders et al. 2009). From the total 366 firms that have to be sampled, a minimum of two investors is decided to be approached for a survey based on convenience sampling. Hence the total sample for the study is

Sample size =366*2

= **732** respondents

**Table 3. 3 Classification of the cities**

| Geographical Strata | Cities | Selected |
|---|---|---|
| West | Mumbai, Pune, Baroda | Mumbai |
| North | Delhi, Indore, Jaipur | Delhi |
| South | Hyderabad, Chennai, Bangalore | Chennai |
| East | Kolkata, Guwahati, Bhubaneswar | Kolkata |

**Table 3. 4 Regional wise category**

| Cities | Percentage Of Capital Market Turnover (NSE) | Sample size distribution |
|---|---|---|
| Mumbai | 60.5 | 222 |
| Delhi | 21.8 | 80 |
| Chennai | 9.6 | 35 |

| | | |
|---|---|---|
| Kolkata | 8.3 | 29 |
| | **TOTAL** | **366** |

***Source:*** *NSE Fact file report*

Hence, this research used a combination of both probability and non-probability sampling. to select individual investors convenience sampling method under a non-probability sampling technique was undertaken. For selecting the sample of individual investors proportionate stratified random sampling under probability sampling was used to select the States. Further to select the sample of respondents from these states, convenience sampling under non-probability sampling was used.

### 3.11 Statistical Analysis

The research has employed various types of statistical techniques. The Statistical Package for Social Science (SPSS) and Excel provided most methods employed. To create generalizations and population forecasts, descriptive statistics which were able to describe numerically and inferential statistics were used. Principal component analysis, multiple regression and SEM analysis were performed using SPSS and Warp PLS. The descriptive statistics include mean, median and standard deviation and the Inferential Statistics includes factor analysis, correlation and regression.

### 3.12 Summary of the Chapter

The chapter outlined the principles underlying the design of the study and the research methodology used. This section also contains sampling methods used, data sources, the technique used for sampling, the research tool, and the statistical instruments used. The quantitative works involved in the study have been discussed in detail. The next chapter discusses in detail the analysis of data.

# CHAPTER 4

# DATA ANALYSIS AND INTERPRETATION

## 4.1 Chapter Overview

In this chapter, the analysis was conducted to investigate the impact of market factors and the herding behavior of the investors on their sentiments towards investment decision making. The primary data was collected by the administration of the questionnaire and for the analyzed. The results of the analysis are presented in this chapter. Section 4.2 deals with the introduction, section 4.3 explains data editing and coding. Section 4.4 describes the socio-demographic information of the respondent.4.5 deals with factors influencing investor sentiment and investment decision-making. Section 4.6 describes the data analysis strategy section 4.7 explains the evaluation of the measurement model. Section 4.8 describes reliability analysis and 4.9 section is validity analysis. Section 4.10 explains cross-loading. Section 4.11 gives correlation analysis, section 4.12 states structural equation modeling. The chapter ends with the summary in section 4.13

## 4.2 Introduction

The data set was used to examine the assumptions of factor analysis and structural equation modeling. The results of the analysis and hypotheses testing are presented in this chapter. The results are discussed in terms of their relationship with research objectives. These results confirm the presence and impact of the investor sentiment and investment decision making taken into consideration, namely herding, market factors and awareness factors. This chapter presents the analysis of data and discusses the results. The results for the PLS estimation were obtained from WarpPLS 5.0 (Kock 2015). The measurement and structural models were evaluated with 732 samples to test the significance of the path estimates.

The analysis was also conducted for evaluating the effect of awareness factors and its components namely media, internet, social interaction and advocate recommendation on the investors' sentiments towards investment decision making. At the end of this chapter, a model of investors sentimental factors affecting investment decision making is also included.

### 4.3 Data Editing and Coding and Screening

As discussed in the methodology, a total of 805 questionnaires were collected from different states. In data preparation, the first stage was to test for acceptable questionnaires. The collected questionnaires were checked for the quality of responses before the data analysis was done. Editing of the questionnaire included screening to detect illegible, incomplete, inconsistency or ambiguity. This was followed by assigning a code, generally a number to each answer. After the data was added to the data file, data editing has been carried out to detect data entry errors. 48 questionnaires were rejected due to incomplete, unfilled and invalid responses. Then, it was verified to identify the multivariate outliers by using the SPSS and 25 outliers were removed. The data about the 732 questionnaires collected from investors were entered with appropriate variable names. The data was analyzed using WarpPLS software. A number of missing values were further identified. The software WarpPLS 3.0 enables raw data reading standardization. Standardized data generally range from -4 to 4 with outliers assuming value sometimes beyond -4 or 4 towards the left or right extremities. Therefore, the normality of distribution through this step was ensured.

### 4.4 Socio-Demographic Profile of Individual Investors

Previous research has shown that individual investors and their decision making have been related to most common demographic characteristics such as age, gender, educational qualification, marital status, occupation and annual income (Kanchana and Panchanatham 2012). The data were collected, various individual investors. The researcher selected the

personal and demographic variables of respondents such as age, gender, educational qualification, marital status, occupation, annual income and years of experience individual investors from various stock markets. The present study is based on data collected from 732 investors' selected.

### 4.4.1 AgeWise Classification of Respondents

Age is considered one of the most important demographic variables. The behavior and attitude of the respondents vary among the different age groups. Individual investors are coming under this study are drawn and they are classified into five categories based on their age to which they belong. The age group which they belong to below 25, 26-35, 36-45, 46-55 and above 55. Table 4.1 shows the age-wise classification of the respondents.

**Table 4.1: Age-wise classification of individual investors**

| Age category | Total | Percentage |
|---|---|---|
| Below 25years | 55 | 7.51 |
| 26-35years | 264 | 36.07 |
| 36-45 years | 207 | 28.28 |
| 46-55 years | 88 | 12.02 |
| 55 and above | 118 | 16.12 |

*Sources: Survey data*

Age is categorized as below 25, 26-35, 36-45, 46-55 and Above 55. Age range between 26-35 is greatly significant in the sample which was 36.07 percent of the sample of the age group. The series between 36-45 and 46-55 represented in the sample which was 28.28 percent and12.02 percent respectively. Above 55 consists of 16.12 percent. It can be said that young investors are more investing in the stock market. younger age people are more investing than old people because the availability of information is very high. These

numbers are in contrast with the findings of another study by Graham et al. (2015) where the average age is 49 years and Barber and Odean (2001) where the average age is about 50 years.

### 4.4.2 Gender Wise Classification of the Respondents

The gender of individual investors is another factor that influences individual decision making. The investors' attitude on the stock market decision may vary based on gender. The gender-wise classification of individual investors is given in Table 4.2.

**Table 4.2: Gender Wise Classification Individual Investors**

| **Gender** | Total | Percentage |
|---|---|---|
| Male | 495 | 67.62 |
| Female | 237 | 32.38 |

*Sources: Survey data*

The sample consisted of 67.62 percent male and 32.38 percent female investors. It can be started from the analysis, the male respondents preferred investing directly in equity shares and whereas the females were rather reluctant to invest in shares which means that males participants seek more risks than females. This might be because females have traditionally been having no access to investment avenues. Male investors, compared to female investors, much more confidence in investing. Male investors are comparably more associated with female participation in investing.

### 4.4.3 Classification of Respondents Based on Marital Status

Marital status of the individual investors given in Table 4.3. In terms of marital status, 72.54 percent of investors were married and 27.46 percent of investors were not married. From the data, it can be observed that the major percentage of sample investors are married and followed by the unmarried sample investors according to marital status. The married

investors view these investments for their future requirements whereas unmarried investors are not showing much interest to invest in the equity investment.

**Table 4.3: Marital Status Wise Classification**

| Marital status | Total | Percentage |
|---|---|---|
| Married | 531 | 72.54 |
| Unmarried | 201 | 27.46 |

*Sources: Survey data*

### 4.4.4 Classification of Respondents based on Educational Qualification

For Individual investors, it is very essential to have high educational qualifications. Hence, based on the educational background, they are classified into 5 groups. The groups they belong to are Below 10th, 12th Standard, Graduation, Post-graduation and others. Table 4.4 depicts the same.

**Table 4.4 Individual Investors Educational Qualification**

| **Educational level** | Total | Percentage |
|---|---|---|
| Upto10$^{th}$ | 89 | 12.16 |
| 12th standard | 118 | 16.12 |
| Graduation | 201 | 27.46 |
| Post-graduation | 177 | 24.18 |
| Others | 147 | 20.08 |

*Sources: Survey data*

The education level of the investors has been categorized into five groups such as Below 10th, 12th Standard, graduation, post-graduation and other qualification. The highest percentage of the respondents was 27.46 percent belonged to the graduate level, a second higher percentage of respondents was 24.18 percent belonged to postgraduate, 20.08

percent belonged to others and 16.12 percent belonged to 12th Standard and nearly 12.16 percent is Below $10^{th.}$

### 4.4.5 Classification of Respondents based on Occupation

Occupation is an important factor that determines the earning capacity of the people. Hence, on the base of occupation respondents were classified into private employees, govt. employees, business, retired, and professionals. The occupation of the respondents is given in Table 4.5 which shows that majority of (31.28 percent) of the respondent were included in the category of private employees.20.36 were come under the government employees, 19.95 were professionals. The remaining respondents were doing business or retired from service.

**Table 4.5: Occupation of Individual Investors**

| **Occupations** | Total | Percentage |
|---|---|---|
| Private employees | 229 | 31.28 |
| Government employees | 149 | 20.36 |
| Business | 90 | 12.30 |
| Retired | 118 | 16.12 |
| Others | 146 | 19.95 |

*Sources: Survey data*

### 4.4.6 Annual Income Wise Classification of Respondents

It is imperative to analyze the income-wise classification of the respondents because the income is the main factor which determines the investment decision making. For the individual investors, the various categories of income hence, based on the average monthly

income, classified into 5 groups 1-4 lakhs, 5-9lakh, 10-14 lakh, 15-19 lakh, and 20 and above.

**Table 4. 6 Annual income of Individual investors**

| Annual income | Total | Percentage |
|---|---|---|
| Less than 4 lakh | 145 | 19.81 |
| 5 lakhs -9 lakh | 199 | 27.19 |
| 10 lakhs -14 lakh | 149 | 20.36 |
| 15 lakhs -19 lakh | 149 | 20.36 |
| 20 and above | 90 | 12.30 |

*Sources: Survey data*

The average monthly income of the members categorized into five groups as stated in the respondents 10-14 Lakh and 15-19 lakh is the highest income group (20.36 percent). 5-10 Lakh groups are (27.19 percent), Above 20 lakhs are (12.30 percent), and below 5 lakh respondents are (19.81 percent). On the income note, most of the investors belonged to the annual income group of 15-20 lakhs (35 percent).

### 4.4.7 Years of Experience of Individual Investors

Years of experience in their respected field of the sample is categorized as under below 2 years and above 2 years. The respondent of below 2 years are (52.19 percent) and the respondent of the above 2 years is 47.81. I.e. most of the respondent is below 2 years.

**Table 4.7 Years of experience of investors**

| **Years of experience** | **Total** | **Percentage** |
|---|---|---|
| Below 2years | 382 | 52.19 |
| 2 years and above | 350 | 47.81 |

*Sources: Survey data*

### 4.4.8 ANOVA and t-test

The researcher used a t-test and one-way ANOVA to test the differences between the various demographic variables and decision making.The result of the t-test are shown as below.

**Table 4.8: Results of t-test**

| Sl. No | Items | Test statistic | P value | Inference | Test used |
|---|---|---|---|---|---|
| 1 | Gender | 4.951 | 0.031 | Significant | *t*-test |
| 2 | Marital status | 10.113 | 0.003* | Significant | *t*-test |
| 3 | Year of experience | 8.456 | 0.002 | Significant | *t*-test |

*Sources: Survey data*
**Significant at 5% level*

Concerning the gender an investors' decision-making t-test results in Table 4.8 shows that there is a significant difference in investment decision making (p-value 0.031). Thus, it confirmed gender disparity affects investors' decision making of individual investors. This is in support of findings by (Pompian and Longo 2004) who found that male is more willing to take a risk with their investments whereas female investors demonstrated conservative investment behavior. Both female and male investors are investing is different. Men are ready to take the unwarranted risk for investment while female investors are more risk-averse to trading decisions (Barber and Odean 2001). Another influential demographic variable that might have bearing on individual investors is marital status. According to the above result, marital status has a significant difference in individual investors among their investment decision making (p-value 003).

#### *4.4.8.1 Age group and Decision Making*

Age is considered one of the most important demographic variable. The behavior and attitude of the respondents vary among the different age groups. In this study, the respondents were classified into four categories 25-35years, 36-45ears, 46-55years and 55years and above.

**Table 4.9: Age group towards investment Decision Making**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Age | Between Groups | 192.554 | 15 | 12.837 | 10.653 | 0.001 |
| | Within Groups | 848.333 | 704 | 1.205 | | |
| | Total | 1040.888 | 719 | | | |

*Sources: Survey data*

One–way ANOVA is used to test whether there is a significant difference between investors' decision making and age of individual investors. In this result, there is a significant difference between investors' decision making and age factor (p-value- 0.031). The researcher is to confirm the findings (Prosad et al 2015).

**Table 4.10: Post Hoc Test – Decision Making and Age Group**

**Multiple Comparisons**

| (I) Age | (J) Age | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Below 25years | 25-35years | 1.25 | 0.474 | 0.082 | -0.10 | 2.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 36-45 years | 1.50* | 0.482 | 0.026 | 0.13 | 2.87 |
| | 46-55 years | 0.36 | 0.513 | 0.954 | -1.10 | 1.82 |
| | 55 and above | -.25 | 0.646 | 0.995 | -2.09 | 1.59 |
| 26-35years | Below 25years | -1.25 | 0.474 | 0.082 | -2.60 | 0.10 |
| | 35-45 years | .25 | 0.422 | .976 | -0.95 | 1.45 |
| | 46-55 years | -.89 | 0.458 | .312 | -2.19 | 0.42 |
| | 55 and above | -1.50 | 0.603 | .0114 | -3.22 | 0.22 |
| 36-45 years | Below 25years | -1.50* | 0.482 | .026 | -2.87 | -0.13 |
| | 25-35years | -.25 | 0.422 | 0.976 | -1.45 | 0.95 |
| | 46-55 years | -1.14 | 0.465 | 0.123 | -2.47 | 0.19 |
| | 55 and above | -1.75* | 0.609 | 0.048 | -3.49 | -0.01 |
| 46-55 years | Below 25years | -0.36 | 0.513 | 0.954 | -1.82 | 1.10 |
| | 25-35years | .89 | .458 | .312 | -.42 | 2.19 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 36-45 years | 1.14 | .465 | .123 | -.19 | 2.47 |
| | 55 and above | -.61 | .634 | .870 | -2.42 | 1.20 |
| 55 and above | Below 25years | .25 | .646 | .995 | -1.59 | 2.09 |
| | 25-35years | 1.50 | .603 | .114 | -.22 | 3.22 |
| | 36-45 years | 1.75* | .609 | .048 | .01 | 3.49 |
| | 46-55 years | .61 | .634 | .870 | -1.20 | 2.42 |

*Sources: Survey data*

The results of the post hoc test depict that the mean score was significantly different between the up to below 25 years and 26-35 age group and 36-45 age group and 46-55 age group and 55 and above age group. The higher mean difference is found among 25 to 35 age groups. It indicates that the level of age group is widely affecting investment decision making between these categories. Thus, it confirms that there exists a significant relationship between age group and investment decision making.

#### *4.4.8.2 Educational Level and Decision Making*

The level of education is considered an important factor that influences investment decisions. Hence, it is essential to classify the respondents based on the educational background.

**Table 4.11: Educational Level and Investment Decision Making**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Educational level | Between Groups | 305.860 | 15 | 20.391 | 14.114 | 0.002 |
| | Within Groups | 1017.072 | 704 | 1.445 | | |
| | Total | 1322.932 | 719 | | | |

*Sources: Survey data*

Educational qualification is another demographic factor that has been related to the investment decision making of individual investors. Education plays a leading role in the development of investment decision making. In this sense, the result of one-way ANOVA reveals that there is a significant difference between the educational level and investment decision making (p-value- 0.002). This result is in agreement with (Metawa et al. 2019) that education does prove to influence an investment decision. Further, the Post Hoc test is applied to verify which group has a significant difference. Education level expresses the values of investment, creates attitudinal changes among investors, more broadly, it reflects a lifestyle with many investment options in the equity investment. Education is a powerful factor for the investor's analysis of the merits and demerits of investment in equity investment.

**Table 4.12: Post Hoc Test – Educational Level and Investment Decision Making**

**Multiple Comparisons**

| (I) Educational level | (J) Educational level | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Schooling | $12^{th}$ Standered | $1.86^{*}$ | .441 | .001 | .60 | 3.12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Graduation | 1.96* | .454 | .001 | .67 | 3.26 |
| | Post-graduation | .83 | .481 | .435 | -.55 | 2.20 |
| | others | .21 | .598 | .996 | -1.49 | 1.92 |
| 12th Standard | Schooling | -1.86* | .441 | .001 | -3.12 | -.60 |
| | Graduation | .11 | .375 | .998 | -.96 | 1.18 |
| | Post-graduation | -1.03 | .407 | .103 | -2.19 | .13 |
| | others | -1.64* | .541 | .032 | -3.19 | -.10 |
| Graduation | Schooling | -1.96* | .454 | .001 | -3.26 | -.67 |
| | 12th Standard | -.11 | .375 | .998 | -1.18 | .96 |
| | Post-graduation | -1.14 | .420 | .070 | -2.34 | .06 |
| | others | -1.75* | .551 | .022 | -3.32 | -.18 |
| Post-graduation | Schooling | -.83 | .481 | .435 | -2.20 | .55 |
| | 12th Standard | 1.03 | .407 | .103 | -.13 | 2.19 |
| | Graduation | 1.14 | .420 | .070 | -.06 | 2.34 |
| | others | -.61 | .573 | .822 | -2.25 | 1.02 |
| others | Schooling | -.21 | .598 | .996 | -1.92 | 1.49 |
| | 12th Standard | 1.64* | .541 | .032 | .10 | 3.19 |
| | Graduation | 1.75* | .551 | .022 | .18 | 3.32 |
| | Post-graduation | .61 | .573 | .822 | -1.02 | 2.25 |

*Sources: Survey data*

Further, the Post Hoc test is applied to verify which group has a significant difference. It shows that the mean score for graduates is significantly different from professional degree

holders (the mean difference is 2.02). While postgraduates do not differ significantly from either graduates or professional degree holders. Moreover, (Mankiw and Zeldes 1991) indicated that well-educated individuals are more likely to be financial investors.

#### *4.4.8.3 Occupation and investment decision making*

In occupation cases, high influence on the business, private and government employees. Many investment companies and stockbroking institutes have found that the occupational category can also be used to decide the investment pattern in India. The occupation of the investors paves the way and also influences the investment pattern of the investors.

**Table 4.13 Occupation and investment decision making**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Occupation | Between Groups | 349.360 | 15 | 23.291 | 12.069 | 0.002 |
| | Within Groups | 1358.590 | 704 | 1.930 | | |
| | Total | 1707.950 | 719 | | | |

*Sources: Survey data*

As seen in Table 4.13 the result of ANOVA shows that there was a significant difference in an occupation related to investment decision making (p - 0.008 < 0.05) among different age groups. The result of ANOVA does not give a clear idea on which of the four age groups differ from each other. Hence a post hoc - test was carried out. The result of the post hoc test is given in Table 4.14

**Table 4.14: Post Hoc Test – Occupation and Investment Decision Making**

**Multiple Comparisons**

| (I) Occupation | (J) Occupation | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| salaried | Professional | 1.35* | .413 | .018 | .17 | 2.53 |
| | Business | 2.18* | .459 | .000 | .87 | 3.49 |
| | Retired | 1.15 | .413 | .059 | -.03 | 2.33 |
| | Others | 2.04* | .459 | .001 | .73 | 3.35 |
| Professional | salaried | -1.35* | .413 | .018 | -2.53 | -.17 |
| | Business | .83 | .476 | .421 | -.53 | 2.19 |
| | Retired | -.20 | .432 | .990 | -1.43 | 1.03 |
| | Others | .69 | .476 | .605 | -.67 | 2.04 |
| Business | salaried | -2.18* | .459 | .000 | -3.49 | -.87 |
| | Professional | -.83 | .476 | .421 | -2.19 | .53 |
| | Retired | -1.03 | .476 | .214 | -2.39 | .33 |
| | Others | -.14 | .516 | .999 | -1.61 | 1.33 |
| Retired | salaried | -1.15 | .413 | .059 | -2.33 | .03 |
| | Professional | .20 | .432 | .990 | -1.03 | 1.43 |
| | Business | 1.03 | .476 | .214 | -.33 | 2.39 |
| | Others | .89 | .476 | .353 | -.47 | 2.24 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Others | salaried | -2.04* | .459 | .001 | -3.35 | -.73 |
| | Professional | -.69 | .476 | .605 | -2.04 | .67 |
| | Business | .14 | .516 | .999 | -1.33 | 1.61 |
| | Retired | -.89 | .476 | .353 | -2.24 | .47 |

*Sources: Survey data*

A post hoc analysis is conducted to investigate which occupation has more association on investment decision making of individual investors. Post hoc analysis in the ANOVA test indicates that investor occupation groups and investment decision making are dependent on each other.

#### *4.4.8.4 Annual income and decision making*

Income creates that equity investment awareness is influenced by the bases of income (Guiso and Jappelli 2005; Kumar and Goyal 2016). If the higher level of rises in income can increase the chance of the amount invested and the buying stock also increases. This research has both theoretical and practical contributions. This study adds to the literature on demographic roles by presenting the various factors influencing investors and their decision making.

**Table 4.15: Annual income and Decision making**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Annual income | Between Groups | 279.479 | 15 | 18.632 | 13.658 | 0.004 |
| | Within Groups | 960.382 | 704 | 1.364 | | |
| | Total | 1239.861 | 719 | | | |

*Sources: Survey data*

As seen in Table 4.15 the result of ANOVA shows that there was a significant difference in annual income and investment decision making (p - 0.004 < 0.05). The present study confirms with the finding of (Kumar and Goyal 2016) annual income does influence investment decision making. Hence a post hoc - test was carried out. The result of the post hoc test is given in Table 4.16.

**Table 4.16 Post Hoc Test – Decision making an annual income**

**Multiple Comparisons**

| (I) Annual income | (J) Annual income | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| 1-5 lakh | 5-10lakh | 1.48* | .447 | .015 | .21 | 2.76 |
| | 10-15 lakh | 2.29* | .484 | .000 | .91 | 3.67 |
| | 15-20 lakh | .78 | .469 | .471 | -.56 | 2.12 |
| | 20 and above | 1.22 | .469 | .088 | -.12 | 2.56 |
| 5-10lakh | 1-5 lakh | -1.48* | .447 | .015 | -2.76 | -.21 |
| | 10-15 lakh | .81 | .463 | .419 | -.51 | 2.13 |
| | 15-20 lakh | -.71 | .447 | .518 | -1.98 | .57 |
| | 20 and above | -.26 | .447 | .976 | -1.54 | 1.01 |
| 10-15 lakh | 1-5 lakh | -2.29* | .484 | .000 | -3.67 | -.91 |
| | 5-10lakh | -.81 | .463 | .419 | -2.13 | .51 |
| | 15-20 lakh | -1.51* | .484 | .025 | -2.89 | -.13 |
| | 20 and above | -1.07 | .484 | .196 | -2.45 | .31 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15-20 lakh | 1-5 lakh | -.78 | .469 | .471 | -2.12 | .56 |
| | 5-10lakh | .71 | .447 | .518 | -.57 | 1.98 |
| | 10-15 lakh | 1.51* | .484 | .025 | .13 | 2.89 |
| | 20 and above | .44 | .469 | .877 | -.89 | 1.78 |
| 20 and above | 1-5 lakh | -1.22 | .469 | .088 | -2.56 | .12 |
| | 5-10lakh | .26 | .447 | .976 | -1.01 | 1.54 |
| | 10-15 lakh | 1.07 | .484 | .196 | -.31 | 2.45 |
| | 15-20 lakh | -.44 | .469 | .877 | -1.78 | .89 |

*Sources: Survey data*

### 4.5 Factors influencing investor sentiment and investment decision making

#### 4.5.1. Herding behavior

Herding means similar thinking among individuals. It describes, if any experienced investors invest in any stock, others will follow the same category of investment.

**Table 4.17 Distribution of investors by their level of agreement towards the aspects related to herd behavior**

| | Mean | Std. Deviation | t | Sig. |
|---|---|---|---|---|
| Other investors' trading decisions of the stock volume have an impact on your investment decisions | 3.66 | 1.18 | 15.048 | 0.001 |

| | | | | |
|---|---|---|---|---|
| I invest in stocks where everyone else is investing | 4.07 | 0.91 | 31.730 | 0.001 |
| I can make easy money by following the perception of other share investors | 3.98 | 0.88 | 30.056 | 0.001 |
| I consider stories of successful investors while investing in the share market | 3.38 | 1.23 | 8.417 | 0.001 |
| I give importance to the opinion of peers while investing. | 3.33 | 1.14 | 7.852 | 0.001 |
| You usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market | 3.38 | 1.36 | 7.447 | 0.001 |

*Sources: Survey data*

The majority of investors agree that they expect the herd behavior of the investors. The one-sample t-test with test value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be concluded that investors are having highly agreed on their expectations of the herd behavior of their investment. The highest mean agreement score was found 4.07, to invest in stocks where everyone else is investing. Investors' trading decisions of the stock volume have an impact on your investment decisions have the lowest score of 3.66 was found. In this result, it can be concluded that the most significant component of investors herd behavior is invested in stock where everyone is investing

### 4.5.2. Market factors influencing the investors' sentiments

Market factors consist of price change, market information, the past trend of the stock, fundamentals of the underlying stock, customer preference, the overreaction of price changes. Market sentiment represents the expectations of participants in the market and is, therefore, a measure of investors' global subjective perception. Market sentiment is the general prevailing attitude of investors to anticipate price development in a market.

**Table 4.18 Distribution of investors by their level of agreement towards the aspects related to market factors**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|
| You consider carefully the price changes of stocks that you intend to invest in | 4.48 | 0.68 | 59.005 | 0.000 |
| You have the overreaction to price changes of stocks. | 3.73 | 1.16 | 16.901 | 0.000 |
| Market information is important for your stock investment. | 4.39 | 0.84 | 44.860 | 0.000 |
| You put the past trends of stocks under your consideration for your investment. | 3.40 | 1.19 | 9.072 | 0.000 |
| You analyze the companies' customer preference before you invest in their stocks. | 3.81 | 1.30 | 16.740 | 0.000 |
| | 3.42 | 1.34 | 8.523 | 0.000 |

| | |
|---|---|
| You study the market fundamentals of underlying stocks before making investment decisions | |

*Sources: Survey data*

From Table 4.18, investors agree that they expect that market factors of the stock market. The one-sample t-test with test value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be inferred that investors are having an above-average agreement on their expectations of market factors of their stock purchase. The mean agreement score related to considering carefully the price changes of stocks that you intend to invest is found to be the highest (4.48). The lowest score of 3.40 was found for their past trends of stocks under your consideration for your investment. From the result, it can be concluded that the most significant component of market factors of their price changes of stocks that you intend to invest in the stock market

### 4.5.3. Investor's Sentiment

It can be described as the positive tendencies of an investor towards certain stocks which allow them to arbitrage across the price variations in the security market. Investor sentiment means that the overall attitude of investors toward the financial market. It represents the optimism, confidence or anticipation of investors and may have an impact on their decision making. Investors' sentiments include investors optimism, participation, and stock market outlook

#### *4.5.3.1. Investor Optimism*

Investor's optimism was measured from their level of agreement towards four aspects such as the expectation of positive events, the ability to choose better stock, optimistic about the future and waiting for better times with losing value securities. Table 4.19 presents the

distribution of investors by their level of agreement towards the aspects related to investors' optimism.

**Table 4.19 Distribution of investors by their level of agreement towards the aspects related to investors optimism**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|
| I expect positive events happening to me | 3.90 | 1.14 | 21.331 | 0.000 |
| am confident of my ability to choose better stocks than others | 3.89 | 1.45 | 16.721 | 0.000 |
| I'm always optimistic about my future | 4.27 | 0.59 | 58.513 | 0.000 |
| I tend to hold on to securities losing value waiting for better times | 3.89 | 1.01 | 23.850 | 0.000 |

*Sources: Survey data*

Table 4.19 shows that positive events happening for the majority of the investors are expect. More than 29percentage strongly agree with it, but at the same time 9.02 strongly disagree and 3.69 disagree with it. The positive events happen for the mean agreement score is 3.90 with a standard deviation of 1.14 The one-sample t-test with test value 3 shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be inferred that investors are having an above-average agreement on their expectations of positive events in their stock purchase. The mean agreement score related to optimism about the future is found to

be the highest (4.27). The lowest score of 3.89 was found for their ability to choose better stock and waiting for better times with losing value securities. From the result, it can be concluded that the most significant component of investors' optimism is their optimistic nature about the future followed by the expectation of positive events.

#### *4.5.3.2. Investor Participation*

**Table 4.20 Distribution of investors by their level of agreement towards the aspects related to investors participation**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|
| My past investment successes are attributed to my skills and understanding | 4.00 | 0.72 | 37.729 | 0.000 |
| Presently I will stay invested in the stock market | 3.92 | 1.25 | 19.971 | 0.000 |
| I plan to increase my investment in the stock market for the coming months | 3.92 | 1.05 | 23.817 | 0.000 |
| My past investment successes make me invest more in stocks | 4.04 | 0.81 | 34.899 | 0.000 |

*Sources: Survey data*

From Table 4.20 one-sample t-test with the test, value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be concluded that investors are having highly agreed

on their expectations of the investors' participation in their investment. The mean agreement score related to the participation of past investment success and its found to be the highest (4.07). The lowest score of 3.92 was found for their presence, I will stay invested in the stock market and I plan to increase my investment. From the result, it can be concluded that the most significant component of investors' participation and their past investment success will create invest in more stock.

#### *4.5.3.3. Stock Market Outlook*

**Table 4.21 Distribution of investors by their level of agreement towards the aspects related to the stock market outlook**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|
| I buy shares based on the company's past performance | 3.96 | 1.04 | 24.992 | 0.000 |
| I plan to invest in a stock based on my expectation of market condition | 4.05 | 0.83 | 34.029 | 0.000 |
| I take my investment decision based on current market performance | 4.12 | 0.92 | 33.032 | 0.000 |

*Sources: Survey data*

In this case, investors agree that they expect that outlook of the stock market. The one-sample t-test with test value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be inferred that investors are having an above-average agreement on their expectation of stock market outlook of their stock purchase. The mean agreement score

related to taking my investment decision based on current market performance is found to be the highest (4.12). The lowest score of 3.96 was found for their buy shares based on the company's past performance. From the result, it can be concluded that the most significant component of investors' outlook is their investment decision based on the current market performance of the events.

### 4.5.4. Awareness factors

Every part of the investment process includes people interacting with one another. Investors exchange and discuss stocks market information with neighbors, relatives, friends, and colleagues. Advice is sought from advisors, analysts, bankers, and planners. These factors comprise of all recommendations or advice given by family, internet, magazine friends, brokerage houses etc. which may lead a particular investor to sell, buy or hold security in a stock market. There are various sources of information for investment. The sources which are generally used by the investors should be identified to communicate with the investors very effectively. Awareness factors include media, internet, social interaction and advocate recommendations.

#### *4.5.4.1. Social Interactions*

It means interaction between individuals, which means how our feelings, thoughts and behavior changes affect another person. This pattern is followed while making investment decisions where investors discuss stocks, interact, and make decisions.

**Table 4.22 Distribution of investors by their level of agreement towards the aspects related to social interaction**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Discuss freely with other traders | 4.12 | 0.77 | 39.140 | 0.000 |
| I am influenced by other traders | 4.16 | 0.92 | 34.210 | 0.000 |
| I initiate trading discussions whenever I get an opportunity | 3.61 | 1.34 | 12.257 | 0.000 |
| I avoid discussions about trading at the workplace | 3.61 | 1.03 | 15.997 | 0.000 |
| I am good at networking with other traders | 4.32 | 0.94 | 37.945 | 0.000 |

*Sources: Survey data*

it can be concluded that investors are having highly agreed on their expectation of the social interaction of their investment because. The one-sample t-test with test value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. The mean agreement score related to networking with other traders and it's found to be the highest (4.32). The lowest score of 3.61 was found for their trading discussions whenever I get an opportunity, avoid discussions about trading at the workplace. From the result, it can be concluded that the most significant component of social interaction and their good at networking with other traders.

#### *4.5.4.2. Media Factor*

Many people catch the awareness of any product through the media. It is observed that the media plays a chief part in another source of evidence that influences the investors buying

decision-making process. Media is not just creating awareness among the public but also playing a vital role in terms of providing the required knowledge.

**Table 4.23 Distribution of investors by their level of agreement towards the aspects related to media**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|
| Firmly believe media (newspaper/T.V/magazines etc) enriches my trading knowledge. | 3.13 | 0.97 | 3.706 | 0.000 |
| I depend on the media for gathering information on trading. | 4.17 | 0.84 | 37.661 | 0.000 |
| I don't rely on media for making trading decisions | 4.25 | 0.70 | 47.918 | 0.000 |
| Financial Information on media is not fully correct | 3.58 | 1.40 | 11.207 | 0.000 |
| I purchase stocks which are on the news | 4.27 | 0.79 | 43.405 | 0.000 |

*Sources: Survey data*

It can be seen that the majority of investors agree that they expect the media factors of the investment. The one-sample t-test with test value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be concluded that investors are having highly agreed on their

expectations of the media factor of their investment. The mean agreement score related to purchasing stocks which are on the news and its found to be the highest (4.27). The lowest score of 3.92 was found for their media enriches my trading knowledge. From the result, it can be concluded that the most significant component of media factor and their purchase stocks which are on the news.

#### *4.5.4.3. Internet*

The Internet is the main source of information in the financial markets about the security traded in the market, which leads to the creation of a greater rate of decisions.

**Table 4.24 Distribution of investors by their level of agreement towards the aspects related to internet**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|
| The Internet has given me a new trading community to discuss. | 3.78 | 1.45 | 14.561 | 0.000 |
| I use internet for chats and discussions on trading. | 4.08 | 0.93 | 31.430 | 0.000 |
| I am comfortable with discussions/chat about trading on internet | 3.91 | 0.92 | 26.657 | 0.000 |
| My traders' network has expanded beyond country borders with internet | 4.50 | 0.63 | 63.986 | 0.000 |

| | | | | |
|---|---|---|---|---|
| I am a member of many investments and trading related websites | 3.83 | 1.11 | 20.319 | 0.000 |

*Sources: Survey data*

The mean agreement score related to traders' network has expanded beyond country borders with the internet and it's found to be the highest (4.08). The lowest score of 3.83 was found for their member of many investment and trading related. From the result, it can be concluded that the most significant component of the internet factor is traders' network has expanded beyond country borders with the internet. The one-sample t-test with test value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be concluded that investors are having highly agreed on their expectations of the internet factors of their investment.

#### *4.5.4.4. Advocate recommendations*

Advocate recommendation includes a recommendation from family member recommendation, friend's recommendation, brokerage houses, individual stock brokers.

**Table 4.25 Distribution of investors by their level of agreement towards the aspects related to advocating recommendation**

| | **Mean** | **SD** | **t** | **Sig.** |
|---|---|---|---|---|
| I feel my friends/family have more knowledge about investing in shares than I do | 4.02 | 0.63 | 44.906 | 0.000 |
| I feel people should take professional's advice while making equity Investment | 3.60 | 1.27 | 12.816 | 0.000 |
| | 3.95 | 1.20 | 21.321 | 0.000 |

| | | | | |
|---|---|---|---|---|
| I consider opinions of the firm's majority stockholders | | | | |
| I take individual stockbroker recommendations while investing | 4.04 | 0.94 | 29.786 | 0.000 |
| I take into consideration my colleagues recommendation who frequently invest in equities | 4.04 | 0.77 | 36.427 | 0.000 |

*Sources: Survey data*

The above Table 4.25, it can be concluded that investors are having highly agreed on their expectation of the advocate recommendation of their investment. The mean agreement score related to taking individual stockbroker recommendations while investing and take into consideration my colleagues' recommendation who frequently invest in equities and its found to be the highest (4.04). The lowest score of 3.60 was found for their people should take professional's advice while making equity Investment. From the result, it can be concluded that the most significant component of advocate recommendation is broker recommendations while investing and my colleague's recommendation who frequently invest in equities.

### 4.5.5. Investment Decision making

Decision-making as the process of choosing a particular alternative from many available alternatives. Investment decision refers to deciding the buy and sells orders, rational decision making is coupled with a structured or reasonable thought process.

**Table 4.26 Distribution of Investors by their Level of Agreement towards the Aspects Related to Decision Making**

| | Mean | SD | t | Sig. |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| I never make any investment decisions without consulting my investment advisor | 3.95 | 1.08 | 23.909 | 0.001 |
| I feel as if I am under tremendous time pressure when making an investment decision | 3.37 | 1.39 | 7.143 | 0.001 |
| I feel difficulty in making investment decision | 4.20 | 0.62 | 52.369 | 0.001 |
| I delay making an investment decision until it is too late | 4.23 | 0.70 | 47.756 | 0.001 |
| I prefer to leave the decision to others | 4.19 | 0.93 | 34.794 | 0.001 |
| I only want to hear information about my preferred investment option(equity) | 3.91 | 1.07 | 23.027 | 0.001 |

*Sources: Survey data*

The majority of investors agree that they expect that a good decision making happening to them. The one-sample t-test with test value shows that the mean agreements score is significantly higher than the mean of the response scale as the significance level is less than 0.05. From the result, it can be concluded that investors are having highly agreed on their expectations of the investors' decision making of their investment. The mean agreement score related to delay making an investment decision until it is too late and its found to be the highest (4.23). The lowest score of 3.37 was found for their tremendous time pressure when making an investment decision. From the result, it can be concluded that the most

significant component of investors' decision delay making an investment decision until it is too late.

## 4.6 Data analysis strategy

The quality of the data collected from the sample was first ensured. Analysis of the exploration factor to identify the structure underlying the variables and structural modeling of equations to study the links between the different factors was carried out. These are explained in the sections below.

### 4.6.1. Statistical Tools for Analysis

SPSS was used for descriptive statistical analysis and exploratory factor analysis, and WarpPLS 6.0 was used for detailed data analysis using Structural Equation Modeling. For descriptive statistical assessment and explorative factor analysis SPSS was used and WarpPLS 6.0 used Structural Equation Modeling for a thorough analysis of data. Structural Equation modeling, or more generally known as SEM, was selected as the preferred technique used to evaluate theoretical assumptions using empirical information. In terms of its handling of unobservable constructs, and allows a simultaneous formulation of interactions between various independent and dependent factors, SEM addressed many of the insufficiencies of the first generation regression methods (Haenlein and Kaplan 2004). SEM is a type of variance-based strategy based on partial least squares (PLS). Studies based on PLS are gaining increasing popularity in the fields of information systems, psychology, and social sciences, as demonstrated in a large amount of academic using this technique (Henseler et al.2009).

## 4.7 Evaluation of measurement model

The evaluation of the measurement model (outer model) is important if a structural model (inner model) is to be followed (Henseler et al.2015). The measurement model adequacy

is determined based on reliability measures and validity measurements. The assessment of the measurement model was done using SPSS and Warp PLS.

### 4.7.1. Factor Analysis (FA)

Factor analysis is an essential instrument that is utilized in refinement, development and evaluation of measures, scales and tests (Williams et al. 2010). It is a multivariate statistical procedure in the field of psychology, education and information system which is considering the self-reporting survey of the interpretation (Byrant et al. 1999). Factor analysis works on the concept that observable and measurable can be reduced to less latent variables that share a common variance and are unobservable (Bartholomew et al. 2011). For instrument validation, it is important to determine the measure of construct validity. Factor analysis is the most important method for determining construct validity and it is a method of internal validity of the measurement of the items. It is mainly including exploratory factor analysis, factor loading and validity and reliability of the data.

### 4.7.2. Exploratory Factor Analysis(EFA)

Exploratory factor analysis is determining the set of data for the underlying factor structure. To determine the scale dimensionality, EFA with a principal component method was conducted for each construct and the sub-constructs. To identify the minimum number of factors related to the maximum description of the variance, Varimax rotation was made (Hair et al.1998). The items that load higher than 0.5 are retained while low loading (below 0.3) items are dropped (Tabachnick and Fidell 2007). In this analysis there can be as many components extracted as the number of variables being analyzed (Hair et al. 2006). The percentage of variance explained approach ensures that a minimum percentage of the total variance is explained by the factors. If the factor structure explains 50% it is considered as satisfactory in social science research (Hair et al. 1998). An Eigenvalue represents the amount of variance associated with a factor. In this approach the only factor with an eigenvalue larger than 1.0 is to be considered and is retained for rotation and interpretation.

Principal component analysis of all questions related to investor sentiment and investment decision making was performed using SPSS 21.0 to reduce the larger set of variables into a smaller, conceptually more coherent set of variables, by identifying redundancy among the variables. The items loading above 0.5 have been maintained and the item loading below has been removed. The loading of each indicator should be regarded to be 0.5 or above concerning the hypothesized component (Hair et al. 2009).

The sampling adequacy can be measured by examining the Kaiser-Meyer-Olkin (KMO) (Kaiser 1960) and Barlett's Test of Sphericity was applied. The KMO statistic indicates the proportion of variance in the variables that might be caused by underlying factors. Kaiser-Meyer-Olkin measure of sampling adequacy are: 0.90's (marvelous), 0.80's (meritorious), 0.70's (middling), 0.60's (mediocre), 0.50's (miserable), and below 0.50 (unacceptable) (Ali et al. 2016). Barlett's test of Sphericity is a statistical test for the presence of correlations among the variables and tests the hypothesis that the correlation matrix is an identity matrix. That is, all diagonal elements are 1 and off-diagonal elements 0, implying that all the variables are uncorrelated and therefore unsuitable for structure detection. Bartlett's Test of Sphericity was significant ($p<0.001$) then researchers can move forward with the factor analysis (Netemeyer et al. 2003).

### 4.7.3. Factor structure of Herd behavior

To determine the herding behavior total of 6 items were used. It is found that in the factor structure with an Eigenvalue greater than 1, which together explained over 76.587 percentage of the variance indicated a good fit and hence it was assumed that the model represented the data. The KMO measure of sample adequacy was 0.857 and Bartlett's Test of Sphericity was significant ($p < 0.001$) with a Chi-Square value of 4367.52 with 15 degrees of freedom which was considered as meritorious for further analysis.

Table 4.27 depicts the details of each factor along with items contributing to component loadings for each item. In the result, factor one structure supports all 6 items of herding

behavior all the 6 items of herding behavior are retained as its factor loadings are greater than 0.7.

**Table 4.27 Factor Structure of Herding Behavior**

| Herding behavior Items | Factor 1 |
|---|---|
| Herding behavior 1 | 0.786 |
| Herding behavior 2 | 0.904 |
| Herding behavior 3 | 0.954 |
| Herding behavior 4 | 0.900 |
| Herding behavior 5 | 0.845 |
| Herding behavior 6 | 0.822 |

*Source: Data analysis*

### 4.7.4. Factor structure of market factors

The market factors variable, a total of 6 items were used. It is found that in the Eigenvalue greater than 1, which together explained over 73.167 percentage of the variance indicated a good fit and hence it was assumed that the model represented the data. The KMO measure of sample adequacy was 0.825 and Bartlett's Test of Sphericity was significant ($p < 0.001$) with a Chi-Square value of 2638.023 with 10 degrees of freedom which was considered as meritorious for further analysis.

**Table 4.28 Factor Structure of Market Factors**

| Market factors Items | Factor 1 |
|---|---|
| Market factor 1 | 0.807 |
| Market factor 2 | 0.848 |
| Market factor 3 | 0.871 |
| Market factor 4 | 0.878 |
| Market factor 5 | 0.871 |
| Market factor 6 | 0.798 |

*Source: Data analysis*

It is clear from Table 4.28 that, in the one-factor market factors scale. In the one factor loading, one item was found and eliminated since the factor loadings were less than .50.

### 4.7.5. Factor structure of media factors

The one-factor structure with an Eigenvalue greater than 1, which together explained over 75.947 percentage of the variance indicated a good fit and hence it was assumed that the model represented the data. The KMO measure of sample adequacy was 0.838 and Bartlett's Test of Sphericity was significant ($p < 0.001$) with a Chi-Square value of 2796.568 with 10 degrees of freedom which was considered as meritorious for further analysis.

**Table 4.29 Factor Structure of Media Factors**

| Media factors Items | Factor 1 |
|---|---|
| Media factor 1 | 0.890 |
| Media factor 2 | 0.861 |
| Media factor 3 | 0.905 |
| Media factor 4 | 0.872 |
| Media factor 5 | 0.827 |

*Source: Data analysis*

### 4.7.6. Factor structure of internet factors

In the case of internet factors a total of 5 items was used. It is found that in the two-factor structure with an Eigenvalue greater than 1, which together explained over 72.067 percentage of the variance indicated a good fit and hence it was assumed that the model represented the data. The KMO measure of sample adequacy was 0.728 and Bartlett's Test of Sphericity was significant ($p < 0.001$) with a Chi-Square value of 3437.678 with 10 degrees of freedom which was considered as meritorious for further analysis.

**Table 4.30 Factor Structure of Internet Factors**

| Internet factors Items | Factor 1 |
|---|---|
| Internet factors 1 | 0.867 |
| Internet factors 2 | 0.849 |
| Internet factors 3 | 0.832 |
| Internet factors 4 | 0.856 |
| Internet factors 5 | 0.840 |

*Source: Data analysis*

It is clear from Table 4.30 that, in the one-factor market factors scale. In the one factor loading, one item was found and eliminated since the factor loadings less than .50.

### 4.7.7. Factor structure of social interaction

The factor structure with an Eigenvalue greater than 1, which together explained over 67.512 percentage of the variance indicated a good fit and hence it was assumed that the model represented the data. The KMO measure of sample adequacy was 0.808 and Bartlett's Test of Sphericity was significant ($p < 0.001$) with a Chi-Square value of 2379.114 with 10 degrees of freedom which was considered as meritorious for further analysis.

**Table 4.31 Factor Structure of Social Interaction**

| Social interaction Items | Factor 1 |
|---|---|
| Social interaction 1 | 0.892 |
| Social interaction 2 | 0.890 |
| Social interaction 3 | 0.897 |
| Social interaction 4 | 0.837 |
| Social interaction 5 | 0.732 |

*Source: Data analysis*

It is clear from Table 4.31 that, in the one-factor market factors scale. In the one factor loading, one item was found and eliminated since the factor loadings less than 0.50.

### 4.7.8. Factor structure of advocate recommendation

To determine the factor structure of the advocate recommendation factor, with an Eigenvalue greater than 1, which together explained over 71.12 percentage of the variance indicated a good fit and hence it was assumed that the model represented the data. The KMO measure of sample adequacy was 0.849 and Bartlett's Test of Sphericity was significant ($p < 0.001$) with a Chi-Square value of 2386.039 with 20 degrees of freedom which was considered as meritorious for further analysis.

**Table 4.32 Factor Structure of Advocate Recommendation**

| Advocate recommendation Items | Factor 1 |
|---|---|
| Advocate recommendation 1 | 0.753 |
| Advocate recommendation 2 | 0.886 |
| Advocate recommendation 3 | 0.877 |
| Advocate recommendation 4 | 0.890 |
| Advocate recommendation 5 | 0.882 |

*Source: Data analysis*

It is clear from Table 4.32 that, in the one-factor market factors scale. In the one factor loading, one item was found and eliminated since the factor loadings less than 0.50.

### 4.7.9. Factor structure of investor sentiment

To determine the investor sentiment scale items, a total of 11 items were used. In the three-factor loading, three items of was found and eliminated since the factor loadings less than 0.50. It is found that in the two-factor structure with an Eigenvalue greater than 1, which together explained over 73.167 percentage of the variance indicated a good fit and hence it was assumed that the model represented the data. The KMO measure of sample adequacy was 0.825 and Bartlett's Test of Sphericity was significant ($p < 0.001$) with a Chi-Square value of 2638.023 with 10 degrees of freedom which was considered as meritorious for further analysis.

**Table 4.33 Factor Structure of Investor sentiment**

| Investor sentiment Items | Factor | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Investor optimism | 0.889 | | |
| Investor optimism | 0.905 | | |
| Investor optimism | 0.741 | | |
| Investor optimism | 0.861 | | |
| Investor participation | | 0.663 | |
| Investor participation | | 0.831 | |
| Investor participation | | 0.871 | |
| Investor participation | | 0.864 | |
| Stock market outlook | | | 0.857 |
| Stock market outlook | | | 0.941 |
| Stock market outlook | | | 0.788 |

*Source: Data analysis*

## 4.8 Reliability analysis

In the present study, the reliability was tested by computing Cronbach's Alpha and Composite Reliability for the measurement of all constructs. Cronbach's alpha and composite reliability are used to estimate the reliability of multi-item scales for each construct. It is the reliability measure the degree to which responses are consistent across the items within a measure, i.e. internal consistency (Brown 2002).

In the present study the reliability was tested by computing Cronbach's alpha (α). The values of Cronbach's alpha for various factors are given in Table 4.34, all the factors had

Cronbach's alpha value above 0.7 (Hair 2015), which testified the reliability of the entire set. Hair et al (2014) suggest the use of Composite Reliability as a replacement. The composite reliability, which is a measure of the overall reliability of a collection of heterogeneous but similar items, estimates the extent to which a set of latent construct indicators share in their measurement of a construct. The accepted value for composite reliability is 0.707 or higher (Nunnally and Bernstein 1994) and is considered sufficient to establish reliability (Fornell and Larcker 1981). In this study the Composite Reliability ranges between from 0.869 to 0.961 demonstrate internal item reliability. This ensures the reliability of the measurement instrument used in this study (Table 4.34)

### 4.9 Validity analysis

Validity is the extent to which a scale or set of measures accurately represents the concept of interest (Hair et al. 2009) and ensures the ability of a scale to measure the intended concept. For validating an instrument, it is essential to determine the construct validity of measures.

Structural Equation Modeling involves two distinct steps in modeling:

- Modeling the relationship between latent variables and the measured indicators. This is called the '**Measurement Model'**. PLS-SEM refers to this as the 'Outer Model'.
- Modeling the relationship between the latent variables, which is referred to as the '**Structural Model'** and the 'inner Model' in PLS-SEM (Henseler et al. 2015)

Once the latent variables have been identified, the measured variables (or items or indicators) are assigned to each of the latent variables, to build the measurement model (Malhotra and Dash 2011). Before proceeding to build the structural model to examine the relationships, it is important to ascertain the validity and reliability of the measurement model (Fornell and Larcker 1981).

### 4.9.1. Content/Face validity

It is the extent to which the questions on the instrument and the scores from the questions and it ensures that the questionnaire includes an adequate set of items of the concept. The more the scale items represent the domain of the concept being measured, the greater the content validity (Shekaran and Bougie 2010). It is interested in assessing current performance rather than predicting future performance. It is related to a type of validity in which different elements, skills, and behavior are adequately and effectively measured (Messick 1995). Content validity is defined as "the degree to which items in an instrument reflect the content universe to which the instrument will be generalized" (Straub et al. 2004). In general, content validity involves the evaluation of a new survey instrument to ensure that it includes all the essential items and eliminates undesirable items to a particular construct domain (Boudreau et al. 2004). To obtain content validity, the research instrument was examined by a panel of experts and they were asked to give their comments on the instrument. According to Straub (1989) face or content Validity is based solely on the judgment of the researcher and is the extent to which the items are consistent with the construct.

### 4.9.2. Construct Validity

Construct validity refers to the degree to which measurements for the variables they are intended to measure. According to Diamantopoulos and Winklhofer (2001), "reliability in the internal consistency sense and construct validity in terms of convergent and discriminant validity", which means construct validity includes two types. Convergent Validity indicates the degree to which different items within a construct are related to each other, and Discriminant Validity indicates the degree to which items within a construct are related to another construct. The techniques employed for evaluating convergent and discriminant validity is explained subsequently.

#### *4.9.2.1. Convergent Validity*

Convergent validity tests establish whether responses to the questions are sufficiently correlated with the respective latent variables. It is to use to estimate the validity of the multiple-item scales for each construct. The convergent validity test, if the measure of the construct that in the theory should be interrelated, (Henseler et al. 2015). It refers to the extent to which scores on a measure of high, medium or low relationship with scores obtained on a different measure intended to assess a similar construct (Messick 1995). It is established when the scores obtained with two different instruments measuring the same concept are highly correlated. It is the degree to which two variables measured separately bear a relationship to one another (Gefen 2000). The criteria recommended as the basis for concluding that a measurement model has acceptable convergent validity are the P values associated with the loadings should be lower than 0.05. The loadings for indicators of all respective latent variables must be 0.5 or higher for the convergent validity of a measure to be acceptable (Hair et al. 2009). Convergent validity refers to the correlation of variables with each other within their latent factor.

**Table 4.34 Measurement Model Using SEM**

| Variable | Cronbach alpha | AVE | CR |
|---|---|---|---|
| Herd behavior | 0.875 | 0.766 | 0.951 |
| Market Factor | 0.907 | 0.762 | 0.883 |
| Investor sentiment | 0.952 | 0.712 | 0.961 |
| Media | 0.920 | 0.820 | 0.940 |

| | | | |
|---|---|---|---|
| Internet | 0.882 | 0.720 | 0.928 |
| Advocate recommendation | 0.872 | 0.726 | 0.910 |
| Social interaction | 0.893 | 0.692 | 0.869 |
| Decision making | 0.888 | 0.717 | 0.937 |

*Source: Data analysis*

The Average Variance Extracted (AVE) is evaluated and it is found that AVE values are greater than the acceptable threshold of 0.5 (Hair et al. 2011; Kock 2015). Convergent validity is judged to be adequate when the Average Variance Extracted (AVE) equals or exceeds 0.50 and composite reliability is higher than AVE (Henseler et al. 2015). The AVE is computed by adding the squared factor loading divided by several factors of the underlying construct.

The scale shows good Composite Reliability (CR) as CR value greater than 0.8 the convergent validity of the scale was assessed and was found to be good. For convergent validity assessment, the AVE threshold frequently recommended for acceptable validity is 0.5 (Fornell et al. 1981), and applies only to reflective latent variables. AVE is an attempt to measure the amount of variance that a latent variable component captures from its indicators. Table 4.34 shows the value of AVE for all constructs is larger than 0.5 and the value of the composite reliability is greater than 0.08. Hence convergent validity is deemed to have been established for this study. This shows that each latent factor is well explained by its observed variables.

#### *4.9.2.2. Discriminant Validity*

If the Average Variance Extracted (AVE) of each of the latent variables is greater than the square of the correlations between the two latent variables, together with considered as discriminant validity of the construct (Barclay et al. 1995; Chin et al. 2003). To get discriminant validity, the shared variance between the latent variable and its indicators should be larger than the variance shared with other latent variables (Hulland 1999). Further, the discriminant validity conditions have been met, as shown in Table 4.35. The square root of AVE (diagonal values that are shaded in grey) values is higher than the off-diagonal values (which represent the inter-construct correlations), which is the condition for discriminant validity (Peng and Lai 2012). It is important that a particular item loads high on its construct and also not have a stronger connection with other constructs to establish discriminant validity (Chin 2010). This validity tests verify whether responses from the respondents to the questions are either correlated or not with other latent variables. When discriminant validity acceptable, if the square root of the AVE for each latent variable is higher than any of the correlations between the latent variable (Fornell and Larcker 1981). On the diagonal of the latent variable correlations (Table 4.35) are the square roots of the average variances extracted for each latent variable. Thus the discriminant validity of the measurement model was established.

**Table 4.35 Discriminant Validity**

| | HB | MF | MM | IN | SI | AD | IS |
|---|---|---|---|---|---|---|---|
| **HB** | **0.875** | | | | | | |
| **MF** | 0.436 | **0.872** | | | | | |
| **MM** | 0.563 | 0.426 | **0.905** | | | | |
| **IN** | 0.212 | 0.160 | 0.104 | **0.848** | | | |
| **SI** | 0.288 | 0.062 | 0.186 | 0.216 | **0.832** | | |
| **AD** | 0.124 | 0.494 | 0.196 | 0.158 | 0.415 | **0.852** | |
| **IS** | 0.646 | 0.558 | 0.716 | 0.412 | 0.576 | 0.446 | **0.844** |

*Source: Survey data*

*Note: HB-Herding behavior, MF-Market factors, IS-Investor sentiment, MM-Media, IN-Interne;tAD-Advocate recommendation, SI-Social interaction, DM-Decision-making*

## 4.10 Cross Loading

The cross-loading values of all the constructs show that the items are loaded in and above 0.70 (Moorees and Chang 2006).

**Table 4.36 Cross Loading**

| CONSTRUCT | HB | MF | MM | IN | SI | AD | IS |
|---|---|---|---|---|---|---|---|
| **HB1** | **0.870** | 0.274 | 0.178 | 1.446 | 1.700 | 0.761 | 1.652 |
| **HB2** | **0.898** | 0.622 | 0.302 | 0.238 | 0.273 | 0.159 | 0.280 |
| **HB3** | **0.828** | 0.045 | 0.534 | 0.213 | 0.042 | 0.050 | 0.062 |
| **HB4** | **0.722** | 0.175 | 0.403 | 0.219 | 0.216 | 0.235 | 0.243 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **HB5** | **0.808** | 0.074 | 0.327 | 0.470 | 0.027 | 0.046 | 0.064 |
| **HB6** | **0.807** | 0.313 | 0.042 | 0.310 | 0.044 | 0.061 | 0.246 |
| **MF1** | 0.155 | **0.894** | 0.324 | 0.476 | 0.242 | 0.304 | 0.070 |
| **MF2** | 0.168 | **0.879** | 0.282 | 0.289 | 0.573 | 0.158 | 0.529 |
| **MF3** | 0.060 | **0.796** | 0.019 | 0.274 | 0.016 | 0.118 | 0.033 |
| **MF4** | 0.245 | **0.858** | 0.110 | 0.231 | 0.213 | 0.249 | 0.589 |
| **MF5** | 0.122 | **0.822** | 0.520 | 0.171 | 0.103 | 0.204 | 0.427 |
| **MF6** | 0.017 | **0.941** | 0.225 | 0.458 | 0.011 | 0.037 | 0.013 |
| **MM1** | 0.159 | 0.051 | **0.844** | 0.279 | 0.048 | 0.351 | 0.058 |
| **MM2** | 0.043 | 0.069 | **0.786** | 0.722 | 0.463 | 0.704 | 0.294 |
| **MM3** | 0.128 | 0.168 | **0.852** | 0.462 | 0.087 | 0.472 | 0.004 |
| **MM4** | 0.546 | 0.268 | **0.813** | 0.225 | 0.102 | 0.519 | 0.071 |
| **MM5** | 0.260 | 0.248 | **0.868** | 0.524 | 0.048 | 0.458 | 0.060 |
| **IN1** | 0.059 | 0.072 | 0.125 | **0.846** | 0.073 | 0.567 | 0.088 |
| **IN2** | 0.143 | 0.151 | 0.279 | **0.778** | 0.078 | 0.351 | 0.058 |
| **IN3** | 0.041 | 0.069 | 0.722 | **0.856** | 0.216 | 0.104 | 0.094 |
| **IN4** | 0.501 | 0.032 | 0.550 | **0.864** | 0.145 | 0.072 | 0.145 |
| **IN5** | 0.059 | 0.465 | 0.144 | **0.890** | 0.158 | 0.227 | 0.111 |
| **SI1** | 0.049 | 0.291 | 0.028 | 0.421 | **0.897** | 0.202 | 0.073 |
| **SI2** | 0.021 | 0.457 | 0.429 | 0.323 | **0.709** | 0.125 | 0.078 |
| **SI3** | 0.048 | 0.327 | 0.753 | 0.021 | **0.891** | 0.567 | 0.216 |
| **SI4** | 0.142 | 0.294 | 0.154 | 0.522 | **0.812** | 0.488 | 0.071 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **SI5** | 0.271 | 0.115 | 0.351 | 0.411 | **0.815** | 0.368 | 0.020 |
| **AD1** | 0.220 | 0.230 | 0.448 | 0.406 | 0.422 | **0.829** | 0.006 |
| **AD2** | 0.254 | 0.278 | 0.130 | 0.593 | 0.348 | **0.756** | 0.040 |
| **AD3** | 0.245 | 0.855 | 0.218 | 0.814 | 0.033 | **0.853** | 0.112 |
| **AD4** | 0.145 | 0.032 | 0.041 | 0.550 | 0.422 | **0.814** | 0.145 |
| **AD5** | 0.151 | 0.465 | 0.501 | 0.345 | 0.048 | **0.767** | 0.111 |
| **SI1** | 0.049 | 0.291 | 0.028 | 0.236 | 0.063 | 0.202 | **0.911** |
| **SI2** | 0.021 | 0.457 | 0.429 | 0.042 | 0.087 | 0.125 | **0.862** |
| **SI3** | 0.048 | 0.327 | 0.753 | 0.422 | 0.0102 | 0.567 | **0.847** |
| **SI4** | 0.0232 | 0.032 | 0.041 | 0.550 | 0.121 | 0.072 | **0.789** |
| **SI5** | 0.201 | 0.465 | -0.501 | 0.221 | 0.048 | 0.227 | **0.910** |
| **SI6** | 0.033 | 0.055 | 0.114 | 0.164 | 0.174 | 0.033 | **0.842** |
| **SI7** | 0.156 | 0.183 | 0.105 | 0.074 | 0.029 | 0.156 | **0.832** |
| **SI8** | 0.189 | 0.185 | 0.065 | 0.081 | 0.006 | 0.280 | **0.809** |
| **SI9** | 0.203 | 0.267 | 0.275 | 0.196 | 0.194 | 0.103 | **0.872** |
| **SI10** | 0.041 | 0.143 | 0.264 | 0.510 | 0.404 | 0.041 | **0.901** |
| **SI11** | 0.245 | 0.855 | 0.218 | 0.814 | 0.245 | 0.855 | **0.866** |

*Source: Data analysis*

*Note: HB-Herding behavior, MF-Market factors, IS-Investor sentiment, MM-Media, IN-Internet; AD-Advocate recommendation, SI-Social interaction, DM-Decision-making*

### 4.11 Correlation analysis

A correlation is a single number that describes the degree of relationship between two variables. In this study, the direction of the relationship between all the dependent variables

and their corresponding independent variables is calculated using the correlation coefficient.

**Table 4.37 Correlation Analysis of Herding Behavior to Investor Sentiment**

| Descriptions | r- Value | P | Sig |
|---|---|---|---|
| Herding behavior to Investor sentiment | 0.646** | 0.001** | Significant |

*Source: Survey* data

** p<.01. Correlation is significant at the 0.01 level

The correlation results reveal that there is a significant relationship between herding behavior to Investor sentiment. The degree of relationship (0.646) is a strong positive relationship. This is because herding occurs when the analysts try to mimic the recommendations of other analysts (Welch 2000).

**Table 4.38 Correlation Analysis of Market Factor to Investor Sentiment**

| Descriptions | r -Value | P | Sig |
|---|---|---|---|
| A market factor to Investor sentiment | 0.578** | 0.001** | Significant |

*Source: Survey data*

The correlation analysis between market factor to Investor sentiment shows that there is a significant relationship. The r-value of 0.578 shows that there is a moderate relationship between the two variables.

**Table 4.39 Correlation Analysis of Media to Investor Sentiment**

| Descriptions | r - Value | P | Sig |
|---|---|---|---|
| Media to Investor sentiment | 0.696** | 0.001** | Significant |

*Source: Survey data*

The correlation analysis between media to Investor sentiment shows that there is a significant relationship. The r-value (0.696) shows that there is a very strong relationship and it is a very important role in the changes in the investor sentiment. The media can push trading activity and it can trigger a positive attitude towards trading activity (Davis 2006).

**Table 4.40 Correlation Analysis of Internet to Investor Sentiment**

| Descriptions | r - Value | P | Sig |
|---|---|---|---|
| Internet to Investor sentiment | 0.412** | 0.001** | Significant |

*Source: Survey data*

The correlation analysis between Internet to Investor sentiment shows a significant relationship. The r-value of 0.412 shows that there is a moderate relationship between the two variables. Barber and Odean (2001) demonstrated that the rise of the internet dramatically changed the way people make investment decisions.

**Table 4.41 Correlation Analysis of Social Interaction to Investor Sentiment**

| Descriptions | r - Value | P | Sig |
|---|---|---|---|
| Social interaction to Investor sentiment | 0.576** | 0.001** | Significant |

*Source: Survey data*

The correlation analysis between Social interaction to Investor sentiment shows a significant relationship. The r-value of 0.576 shows that there is a strong relationship between the two variables. This proves that social interaction leads to investor sentiment. If social interaction is increased, they develop a favorable attitude towards trading. This is because, social interactions induce trading and the ‘investor finds the market more attractive when more of his peers participate (Hong et al. 2004).

**Table 4.42 Correlation Analysis of Advocate Recommendation to Investor Sentiment**

| Descriptions | r -Value | P | Sig |
|---|---|---|---|
| Advocate recommendation to Investor sentiment | 0.447** | 0.001** | Significant |

*Source: Survey data*

The correlation analysis between advocate recommendation to Investor sentiment shows a significant relationship. The r-value of 0.497 shows that there is a moderate relationship between the two variables. But the degree of correlation is not highly significant since it is not greater than 0.5.

## 4.12 Structural Equation Modelling

Structural Equation Modelling (SEM) is a confirmatory technique used to determine whether the research model developed is valid for data. SEM includes several statistical methodologies meant to estimate a network of causal relationships, defined according to a theoretical model, linking two or more latent variables, each measured through several observable indicators. SEM estimates both the structural and measurement model together. In a structural model, it describes the relationships between the latent variables considered in the model by using $R^2$ and path coefficient. The measurement model describes the relationships between the latent variables and their indicators by using loadings, composite reliability, average variance extracted and cross-loadings. In the present study, a variance-based approach or Partial Least Squares (PLS) was used to validate the research model. Unlike the covariance based approach, the PLS approach, introduced by Wold (1975) focuses on maximizing the variance of the dependent variables explained by the independent ones instead of reproducing the empirical covariance matrix (Haenlein, 2004).

### 4.12.1. Partial Least Square (PLS)

PLS is considered a very general and flexible technique for predictive inferences (Chin 1998; Chin and Newsted 1999) and it involves testing a measurement model and a structural model. To measure the research model, WarpPLS 4.0 was used in the study. Warp PLS was used for the analysis of relationships among latent variables and indicators (Gudergan et al. 2008). PLS yields a solution, even in complex models and does not require variables to meet parametric analysis criteria, such as multivariate normality and large sample sizes; as it pre-processes the data before SEM analysis and makes it easy to correct problems with the data, such as identical column names, columns with zero variance, and missing values. The Path coefficients (β) and corresponding p-values are obtained by running Warp PLS with a bootstrapping procedure. It tries to identify nonlinear or warped relationships among latent variables and estimates the path coefficient in the model. Structural Equation Modelling (SEM) technique has been adopted (on WarpPLS) to test the various relationships.SEM modeling differentiates two components (a) measurement model, which represents the relationship between latent variables and their indicators, and (b) structural model, which depicts the relationships amongst the latent variables (Chin et al. 2003; Sarkar et al. 2001; Walter et al. 2006).

**Table 4.43 Denotation of the Latent Variables**

| Latent Variable | Denotation |
|---|---|
| Herd behavior | HB |
| Market Factors | MF |
| Awareness factors- | AW |
| Media | MM |
| Internet | IN |
| Social interaction | SI |
| Advocate recommendation | AD |
| Decision making | DM |
| Investors sentiment | IS |

*Source: Survey data*

### 4.12.2. Structural Model for Investors' Sentiment and Decision Making

The structural model output obtained from WarpPLS and is an integrated model with six antecedent variables, and the dependent variables (Investor sentiment, decision making). Shown on the arrows are the path coefficients (beta value) and the path significance (p-value). Table 4.45 shows the path coefficients and significance of the relationships involving investors' sentiment. All the other six antecedent variables have a significant impact on the investors' sentiment. Comparing the path coefficients, it can be seen that herding has the highest impact on investors' sentiment. Investors' sentiment is also found to have a strong, positive influence on investment decision making.

### 4.12.3. Analysis of the Structural Model

After determining the reliability and validity of the latent variables in the measuring model, next is to assess the structural model (also known as the inner model) is to evaluate the relationship between independent and dependent variables. The assessment of the structural model in PLS-SEM includes path coefficients to evaluate the significance and

relevance of structural model relationships, diagnosing collinearity among the measurement constructs, $Q^2$ to evaluate the model's predictive relevance and $R^2$ value to evaluate the model's predictive accuracy (Hair et al. 2013).

### 4.12.4. Collinearity statistics

Multi-collinearity arises when a correlation between two or more model predictors provides redundant data regarding response. Multi-collinearity was measured by variance inflation factors (VIF). The level of multicollinearity is calculated for and is depicted (Table 4.44)

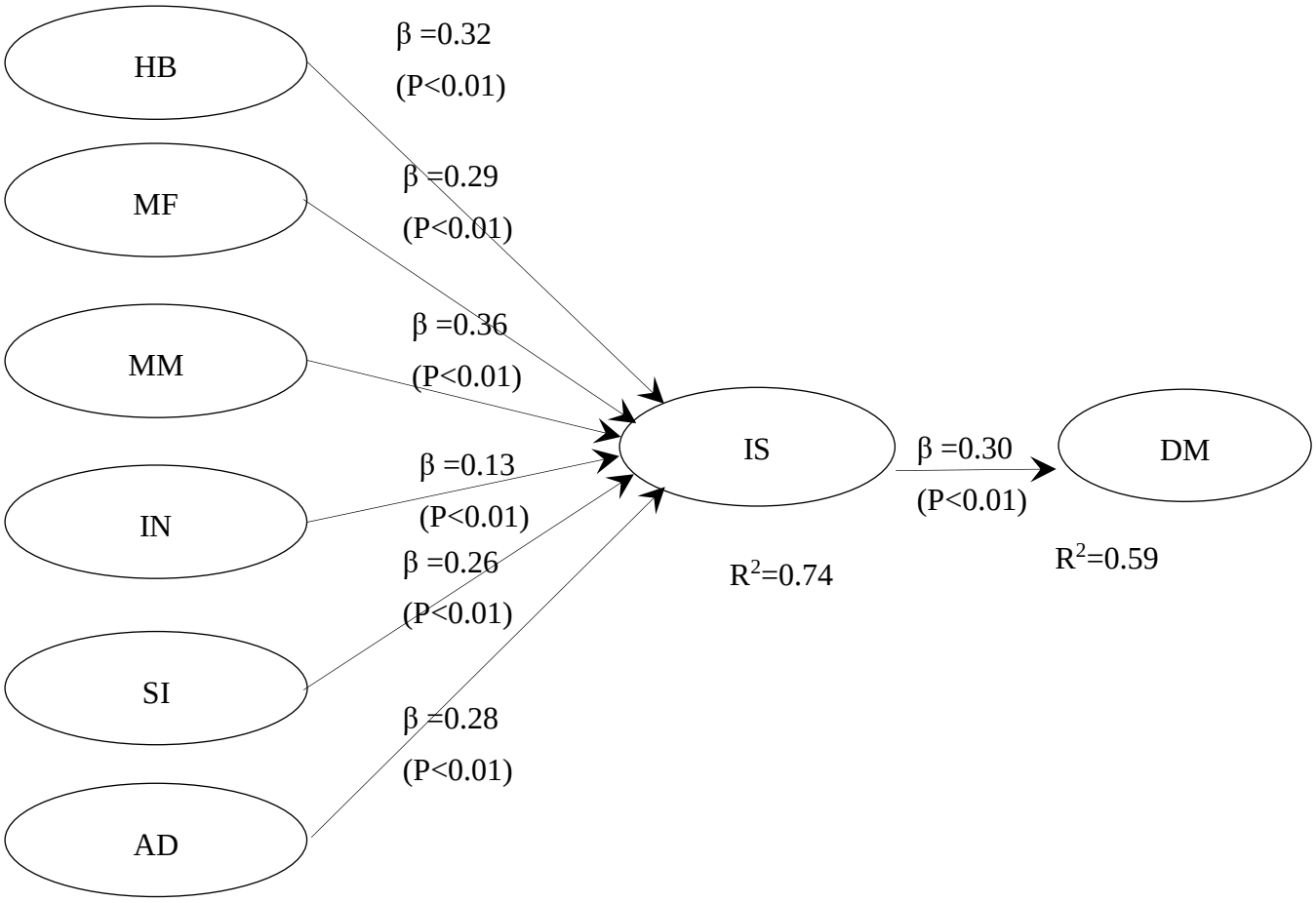
**Table 4.44 Collinearity statistics of structural model (Inner VIFs)**

| **DV** | **IS** | **DM** |
|---|---|---|
| **IV** | **VIF** | |
| HB | 2.146 | |
| MF | 1.162 | |
| MM | 2.624 | |
| IN | 2.353 | |
| SI | 1.681 | |
| AD | 1.325 | |
| IS | | 1.00 |

*Source: Data analysis*

*Note: HB-Herding behavior, MF-Market factors, IS-Investor sentiment, MM-Media, IN-Internet; AD-Advocate recommendation, SI-Social interaction, DM-Decision-making*

The values range within an acceptable range, which is below 5. Hence it shows that there is no issue of multicollinearity within the independent variables.




*Source: Data analysis*

**Figure 4. 1 Results of factors influences investor sentiment and investment decision making**

### 4.12.5. Assessment of path coefficients.

The hypothesised path coefficients were assessed using the PLS-SEM algorithm technique through Warp PLS software. The $R^2$ values of the endogenous constructs. The values of the path coefficient (between + 1 and -1) are used to analyse the strength of the hypothesized relations. The path coefficients values close to +1 represent a strong positive relationship whereas a value near 0 represents a weak relationship. Bootstrapping procedure reports the significance of path coefficient values. It provides the 'P values' (the probability value of the hypothesis).

**Table 4.45 Path Coefficients for the Relationship Between Antecedent Variables and Decision Making**

| Relationship | Path Coefficient | p-value |
|---|---|---|
| HB→ IS | 0.32 | 0.001*** |
| MF → IS | 0.29 | 0.001*** |
| AWM → IS | 0.36 | 0.001*** |
| AWI → IS | 0.13 | 0.001*** |
| AWSI → IS | 0.26 | 0.001*** |
| AWAD → IS | 0.28 | 0.001*** |
| IS → DM | 0.30 | 0.001*** |

*Source: Survey data*

*Note: HB-Herding behavior, MF-Market factors, IS-Investor sentiment, MM-Media, IN-Internet; AD-Advocate recommendation, SI-Social interaction, DM-Decision-making*

**Table 4.46 Summary of Results of Hypotheses Testing**

| Hypothesis | Hypothesis Description | Hypothesis Supported |
|---|---|---|
| H1 | Herd behavior- investors sentiment | Accepted |
| H2 | Market factors- investors sentiment | Accepted |
| H3a | Media- investors sentiment | Accepted |
| H3b | Internet- investors sentiment | Accepted |
| H3c | Social interaction - investors sentiment | Accepted |
| H3d | Advocate recommendation- investors sentiment | Accepted |
| H4 | Investors sentiment- Decision making | Accepted |

*Source: Survey data*

Analysis of path coefficients and significance values of relationships leads us to conclude that all the hypothesis are supported.

### 4.12.6. R square and adjusted R-square values

The $R^2$ is a measure of the model's predictive accuracy. Another way to view $R^2$ is to show the combined impact of the exogenous variables. This effect varies between 0 and 1 and 1 is full predictive accuracy. Because $R^2$ is embraced by a variety of disciplines, the rule of thumb regarding an acceptable $R^2$ with 0.75, 0.50, 0.25, respectively, describing substantial, moderate, or weak levels of predictive accuracy (Hair et al. 2009; Henseler et al. 2013).

**Table 4.47 R- square and Adjusted R- square values**

| Model | R | R- square | Adjusted R-square |
|---|---|---|---|
| 1 | 0.781[a] | 0.610 | 0.609 |
| 2 | 0.751[b] | 0.578 | 0.575 |

*Source: Data analysis*

*Note: a Predictors (Constant), IS, Dependent Variable: DM*

*b Predictors (Constant), HB, MF, AD, MM, II, SI, Dependent Variable: IS*

It was observed that both R-square and adjusted R-square values are nearly the same. Accordingly, the assessment of the structural model using $R^2$ values has well established. It is concluded that the proposed model has significant explanatory power of investor sentiment and investment decision making. The coefficient of determination, $R^2$ was 0.610 for the investor sentiment variable. Six latent variables (HB, MF, AD, MM, II, SI) significantly influenced. R square value for the investor's sentiment and decision-making constructs are 0.610 (Substantial), and 0.578 (Moderate), as shown in Table 4.47 and moderate for values 0.33-0.67(Peng and Lai 2012).

### 4.12.7. Assessment of predictive relevance of the model ($Q^2$)

An indicator of the predictive validity of the model is the Stone- Geisser Q-Squared. A value of greater than zero indicates predictive validity, and higher value indicates better predictive power (Duarte and Raposo, 2010; Peng and Lai, 2012). The $Q^2$ value greater than 0.02, 0.15 and 0.35 is considered to have small, medium and strong predictive relevance (Geisser 2017). Because all the $Q^2$ values are >0, it establishes the fact that the PLS structural model has predictive relevance**.** Hence, the result shows that Q-Squared values of 0.738, and 0.587 indicate the strong predictive validity of the model.

**Table 4. 48 Q-Squared values**

| Endogenous Constructs | **IS** | **DM** |
|---|---|---|
| Q-Squared | 0.738 | 0.587 |

*Source: Survey data*

The estimated model with path coefficient and corresponding p values are provided in the PLS-based SEM analysis, path coefficients are referred to as beta (β) coefficients. The explanatory power of the structural model is evaluated by examining the squared multiple correlation ($R^2$) value of the dependent constructs. The R squared coefficient measures the percentage of variation that is explained by the model.

### 4.12.8. Goodness of Fit (GoF) of the Proposed Model

The final step of the evaluation of the structural model is establishing the goodness of fit. Tenenhaus et al. (2005) recommended the global goodness of fit index for the proposed model. Tanenhaus GoF index is the widely accepted model fit index for PLS-based path modeling (Henseler and Sarstedt 2013). Wetzels et al. (2009) suggested goodness of fit threshold values, small >= 0.1, medium >= 0.25, large >= 0.36. The Tenenhaus goodness of fit index for the present model is 0.572, which confirms that the proposed model has the perfect model fit. All the model fit criteria were well supported.

### 4.12.9. Model Fit, Quality Indices and Model Elements from WarpPLS

WarpPLS software generates two broad categories of Fit Indices, namely, model general model elements and fit, quality Indices. To assess the model fit, it is recommended that the p-values for both the average. R-squared (ARS) and the Average Path Coefficient should (APC) be lower than 0.05. Additionally, it is suggested that the Average Variance Inflation

Factor (AVIF) be equal to or lower than 3 (Kock 2012). The analysis showed that all three fit criteria were met and can reasonably assume that the model has acceptable predictive and explanatory quality as the data are well represented by the model. There are two categories of model fit indices of WarpPLS like general model elements and model fit summary.

**Model fit and quality indices**

Average path coefficient (APC)=0.343, P<0.001

Average R-squared (ARS)=0.736, P<0.001

Average adjusted R-squared (AARS)=0.675, P<0.001

Average block VIF (AVIF)=1.470, acceptable if <= 5, ideally <= 3.3

Average full collinearity VIF (AFVIF)=2.936, acceptable if <= 5, ideally <= 3.3

Tenenhaus GoF (GoF)=0.572, small >= 0.1, medium >= 0.25, large >= 0.36

Sympson's paradox ratio (SPR)=0.938, acceptable if >= 0.7, ideally = 1

R-squared contribution ratio (RSCR)=0.990, acceptable if >= 0.9, ideally = 1

Statistical suppression ratio (SSR)=1.000, acceptable if >= 0.7

Nonlinear bivariate causality direction ratio (NLBCDR)=1.000, acceptable if >= 0.7

**General model elements**

Outer model analysis algorithm: PLS regression

Default inner model analysis algorithm: Warp3

Multiple inner model analysis algorithms used? No

Resampling method used in the analysis: Stable

Number of data resamples used: 732

Number of cases (rows) in model data: 205

Number of latent variables in the model: 6

Number of indicators used in model: 48

Number of iterations to obtain estimates: 6

Range restriction variable type: None

Range restriction variable: None

Range restriction variable min value: 0.000

Range restriction variable max value: 0.000

Only ranked data used in the analysis? No

## 4.13 Summary

The chapter has analyzed the data collected and results have been presented. The factor which is influencing investor sentiment and investment decision making have an interdependency relationship for the individual investor. Herding and market effect have great influence in the investment decision making compared to other factors. These results have opened a new dimension for the study of investor sentiment and investment decision making in the Indian context. The main findings, conclusions of the study, recommendations and future directions for research are presented in the following chapter.

# CHAPTER 5

# INVESTOR SENTIMENT INDEX

## 5.1. Chapter Overview

This chapter investigates the impact of market factors and the herding behavior of investors on their sentiments towards investment decision making. Section 5.2 deals with the investor sentiment index. Section 5.3 describes data variables and measures and 5.4 analysis aggregate sentiment index. Section 5.5 methodology. Section 5.6 states data analysis and section 5.7 end conclusion

## 5.2. Investors' Sentiment Index

Investor sentiment, the behavioral aspect of asset price volatility, widely identified as the belief about the future cash flows and investments are unjustified by the facts involved (Baker and Wurgler 2007). The cause of investor sentiment is the irrational exuberance or unsustainable excitement of investors that pull asset prices to concentrations not supported by intrinsic values. Sentiment can reflect investors ' biases like over-optimism or pessimism that can force prices below their intrinsic values. The market movement, representability, conservatism and a spontaneous reaction of change in demand influence return volatility in an intuitive way investor sentiment (Brown and cliff 2004; Barberis et al.1998).

The fundamental motive for carrying out the present empirical study on the fastest-growing Indian stock market derives from various logical reasons. Recent developments in behavioral finance and empirical evidence contradict the classical financial theory and the rational view of participants on the capital market. Rational players do not seem to have a strong insight into the intrinsic value of the property that is comparable to the current value of future cash flows (Baker and Wurgler 2007). Presence of irrational investor sentiment

in the developed capital markets indicator of an abnormality and a systematic risk factor (Brown and Cliff 2004; Lemmon and Portniaguina 2006; Qiu and Welch 2006). Hence, this study addresses the role of irrational investor sentiment in India's stock market volatility.

### 5.3. Data Variables and Measures

This study adopted a top-down approach to estimate the investor's sentiments and employed indirect aggregate investor sentiment measurements to construct the market aggregate index. Nevertheless, adjustments are made based on the appropriateness and availability of data on the Indian stock market. The identified categories of investor sentiment variables that influence the stock prices: Sentiment index construction is a quantitative measure of aggregate investor sentiment from market-related sentiment factors to estimate the market abnormalities. These sentiment proxies include trading Volume (TV), Put Call Ratio (PCR), Advances and Decline ratio (ADV/DEC), Market Turnover (MT), Share Turnover (ST), and Number of IPO. The aggregate investor sentiment index is the first principal component of these sentiment indicators by some fundamental factors. The main variables of the construction of the sentiment index are: The Trading Volume (TV) is measured as the NSE Nifty turnover. The next two proxies for investor sentiment are derived from Initial Public Offering data. Follows the approach adopted by Baker, et al. (2012) and compute our variables, the number of initial public offerings (NIPO) the number of initial public offerings (NIPO) defined as the log of the total number of IPOs during the period. Baker et al. (2012) argue that insiders and long-run shareholders have strong incentives to time the equity market when valuations are greatest, which is presumably when sentiment is highest. This market timing hypothesis suggests that the higher (lower) value of NIPO means that the market sentiment is bullish (bearish) (Baker and Wurgler 2006). It is the commonly used variables in recent studies. Because it is argued that NIPO can be considered as the sentiment indicator since the demand for IPO is often

sensitive towards the market condition (Brown and Cliff 2004; Baker and Wurgler 2007; Baker et al. 2012; Corredor et al. 2013; Dash and Mahakud 2013).

The next proxy is the Advances and Decline ratio (ADV/DEC), the ratio of the number of advancing issues to the number of declining issues (Brown and Cliff 2004). It calculates measures by using the data from the National Stock Exchange. The rising (declining) trends of the ADR confirm the upward (downward) trend of the market (Brown and Cliff, 2004). Theoretically, ADV/DEC ratio is expected to be positively related to the sentiment. ADR represents the ratio of the number of advancing and declining stock prices. It helps to know the recent trends and performance of the stock market. A rising value of ADR means an upward trend and a lower value shows a downward trend of the market. ADR represents the ratio of the number of advancing and declining stock prices. It helps to know the recent trend of the stock market performance.

The subsequent proxy, PCR, is measured as the ratio of the trading volume put options to the trading volume of call options. It is measured as the trading volume of put options divided by the trading volume of call options. Higher (lower) the ratio, bullish (bearish) is the sentiment in the market. When the market is bearish, they buy put options either to hedge their spot positions. Therefore, when the trading volume of put options becomes larger about the trading volume of call options, the ratio goes up and vice versa (Brown and Cliff 2004; Finter et al. 2011; Wang et al. 2006). Trading volume(TV) represents the market liquidity. In a highly liquid market, the irresistible investors cause frequent trading so that the trading volume is high so as the turnover rates. Studies such as Qiang and Shu-e (2009) and Zhu (2012) use the turnover as an inevitable sentiment indicator. Chuang et al. (2010) use trading volume as a proxy for investor sentiment index.

Macroeconomic issues that flash up pretty often in the media tend to influence investor sentiment quite significantly. It can be seen that issues such as low foreign exchange reserve, high level of inflation, corporate and debt turnover are often discussed in the media which affects the behavior of market participants to a certain extent. Based on this intuition,

this study used the variables like macroeconomic factors like exchange rate, wholesale price index, index of industrial production, net foreign institutional investment and term spread to measure aggregate investor sentiment

### 5.4. Aggregate Sentiment Index

Based on the scientific body of literature, Baker and Wurgler (2007); Brown and Cliff (2004); Baker et al. (2012) propose two investor sentiment indices and the ways to construct the investor sentiment index. It constructs the irrational sentiment index following the standard literature. In the first approach, this study employs 6 indirect measures of sentiment proxies to create an index taking the first principal component of these 6 indirect measures and the lagged components of these sentiment variables. In the second step, it computes the correlation between the indexes constructed in the first step and the lead and lag values of the indirect sentiment measures. Finally, it computes the index taking the difference between Step 1 and Step 2. In the second approach, following Baker and Wurgler (2006), study to go for orthogonalization of the sentiment proxies. Certain sentiment proxies described here are likely related to the present economic phenomenon. Hence, it is isolated that our findings are not driven by the fluctuations in macroeconomic fundamentals, rather than sentiment fluctuations This study uses six macroeconomic variables to remove the macroeconomic component from the measured sentiment index. To compute the irrational sentiment index in the first step, it needs to regress, each sentiment proxies on the mentioned 6 economic fundamentals in the preceding section. To orthogonalize our sentiment indicators, we run a regression for each sentiment indicator. In the second step, it obtains the residuals of each 6 regression and treats them as better proxies. It employs the obtained residuals in the subsequent analysis as the orthogonalize sentiment proxies. Item ploys the following model to eliminate the redundant effect of macroeconomic variables.

## 5.5.Methodology

This study employs an approach for measuring investor sentiment in Turkey that is similar to the methodology used by Qiu and Welch (2006); Verma and Soydemir (2009); Calafiore (2010) for estimating individual sentiment. There is no perfect index of investor sentiment available; however, there are some investor sentiment proxies that are likely to contain some component of both rational and irrational investor sentiments (Brown and Cliff 2004; Shleifer and Summers 1990). Qiu and Welch (2006) show that some important macroeconomic information is likely to be correlated to current economic conditions. The approach to extracting the investor perception component by regressing the consumer confidence index on a set of macroeconomic factors is consistent with Qiu and Welch (2006); Baker and Wurgler (2006); Lemmon and Portniaguina (2006); Verma and Soydemir (2009); Schmeling (2009). The analysis has been done by employing various econometric techniques, such as the Ordinary Least Squares (OLS), Generalized Autoregressive Conditional Heteroskedastic models GARCH and Granger Causality. After constructing the aggregate investor sentiment index, its impact on excess stock market return and volatility has been tested.

## 5.6.Data Analysis

### 5.6.1. Summary Statistics

The present study chooses NSE Nifty to represent aggregate market returns. The choice of the data period is dedicated to the availability of data. Six market-related implicit sentiment indicators were choosen based on their use in the literature and relevance with the Indian stock market behavior. The monthly data spans from January 2000 to December 2016. The sample period is based on the availability of data for all the variables used in this study. In this section, this study elaborates on the choice of investor sentiment indicators to construct the Irrational Aggregate Sentiment Index. The collected data from the NSE India, Securities, and Exchange Board of India (SEBI),) to construct the sentiment index. The

data for the present study is received from monthly macroeconomic data from the RBI's Database on Indian Economy. Market-related data from the data zone of the official website of the National Stock Exchange of India. The sample period is January 2000 to December 2016, totaling 204 observations for monthly data variables.

**Table 5. 1 Descriptive statistics**

| | Mean | Median | Maxi | Mini | Std. Dev. | Skewness | Kurtosis | Jarque-Bera |
|---|---|---|---|---|---|---|---|---|
| **TV** | 6.289 | 5.353 | 19.50 | 0.380 | 3.181 | 1.61 | 6.20 | 175.21 |
| **ST** | 3.147 | 2.442 | 7.79 | 1.369 | 1.505 | 1.20 | 3.42 | 51.28 |
| **IPO** | 5.705 | 5.000 | 29 | 0.000 | 4.999 | 1.29 | 5.11 | 94.70 |
| **MT** | 2012.8 | 6969. 6 | 1463.26 | 1989.55 | 30243.94 | 2.201 | 7.06 | 304.7 |
| **PCR** | 140.7 | 51.01 | 1379.47 | 24.07 | 253.07 | 3.247 | 12.89 | 1189.8 |
| **ADR** | 93.82 | 91.0 | 196.0 | 55.0 | 21.35 | 1.06 | 5.92 | 111.41 |

*Source: Data analysis*

*TV=Trading volume, ST= Share turnover, IPO=Initial public offer, SMT=Market turnover PCR=Put call ration, ADR=Advance decline ration*

Table 5.1 reports the descriptive statistics of all the variables used in the first stage analysis. From this Table 5.1 it can be observed that during the period of investigation the mean values of all the sentiment indicators except the net investment of mutual funds are

positive. While the positive value of the put-call option ratio shows the market as bearish sentimental the mean values of ADR, ST, MT, TV measures indicate the market has been performing well.

### 5.6.2. Unit Root Tests

The Augmented Dickey-Fuller (ADF) Test (Dickey and Fuller 1981) was performed to analyze unit-roots of the time series properties of each variable. Table 5.2 shows the results of unit root tests using the ADF Test. Unit root tests were run with a linear trend and intercept at levels and intercept only at first differences. The appropriate number of lags is two. Therefore, the ADF test suggests that the null hypothesis of non-stationarity is rejected for first differences as the time-series properties of each variable is stationarity. A Stationarity test was conducted by the study to determine the statistical properties of the time-series data used in the study. Stationarity was examined by performing a unit root test. A unit root is a feature of processes that evolve through time that can cause problems in statistical inference involving time series models. Before employing these econometrics techniques, the stationary properties of both the time series have been confirmed by the Augmented Dickey-Fuller (ADF) unit root tests.

This study employed the use of both Augmented Dickey-Fuller (ADF) test, and Phillips-Perron (PP) tests in testing stationarity of the data. The two methods were used for their comparability. ADF is considered more restrictive than PP. In cases where a variable is not stationary using ADF but stationary using PP, the PP test was used to test results and make a judgment as PP has higher power than ADF in the presence of structural breaks (Nyangoro 2013). Following this rule, when PP results in conflict with ADF results, PP results are interpreted. Table 5.2 shows the stationarity test results. ADF statistic, used in the test, is usually a negative number. The more negative it is, the stronger the rejection of the hypothesis that there are unit roots at some level of confidence and it represents the unit root test results obtained from the two standard unit root tests, i.e. the Augmented Dickey-

Fuller and Phillips Perron tests. In these tests, consider the variables in levels and in the first difference. The results indicate that the null hypothesis of a unit root cannot be rejected for all the variables in levels. However, it is rejected in first differences. Thus all variables become stationary after differencing them once i.e. each of them is integrated of order one.

### 5.6.3. Univariate conditional volatility models

In the present study, the study employs the comprehensive GARCH classes of models to extract the conditional volatility from investor sentiment index and stock returns of market portfolios for the second step estimation. GARCH model is the most preferred model to capture the volatility symmetry in financial returns. The GARCH (1, 1) process with conditional normal distribution is the most popular generalized ARCH specification in the empirical research. In this model, weights on past squared residuals decline geometrically at a rate, which can be estimated from the data.

The methods employed in the present study are Univariate Nonlinear Conditional Heteroskedastic models to estimate monthly time-varying conditional volatility for Indian stock market portfolios and irrational sentiment index. The study employs (Bollerslev 1986) Generalized Autoregressive Conditional Heteroskedastic models (GARCH), popularly known to capture the volatility clustering and volatility symmetry effect in the conditional variance equation. The prerequisite for Univariate nonlinear models is to check for the persistence of serial correlation in the time series of stock returns and the conditional variance of the series. For diagnostics of serial correlation, this study uses the Autoregressive Conditional Heteroscedasticity (ARCH) test of (Engle 1982), Autoregressive Conditional Heteroscedasticity-Lagrange Multiplier (ARCH-LM) of (Engle and Ng 1993; Mcleod and Li 1983)tests before and after the estimation of conditional models.

Where, $\omega 0 > 0$ and $\alpha i$ þ $\beta i < 1$. $Y_t$ represents the index stock returns, and sentiment index this conditional variance, $\beta 0$ represents the coefficient of the model. $\alpha i$ is the coefficients

of the lagged squared residuals and βi is the lagged conditional variance. Nelson (1991) identifies the limitations of GARCH in analyzing financial market volatility. To overcome the weaknesses of the GARCH, Nelson (1991) proposes an exponential GARCH model.

**Table 5. 2 Unit Root Tests(ADF)**

| Variable | At Level | At First difference |
|---|---|---|
| Advanced Decline Ratio | -2.9922* | -12.5155*** |
| Market Turnover | -2.3387 | -15.2006*** |
| No Of IPO | -2.5932* | -13.1916*** |
| PCR | -2.9390* | -4.4786*** |
| Trading Volume | -2.6548* | -16.4542*** |
| Share Turn Over | -3.7966* | -15.2835*** |

*** 1% , ** 5%  * 10% This variable represent variable are significant at 1% and 10% respectively

### 5.6.4. Empirical results

This section discusses the empirical results of the present study. Before proceeding to the main findings, we check the time-series properties of each variable by performing the unit root test. To check the stationery of the series, it employs the augmented dickey-fuller (Dickey and Fuller 1981), Unit root test statistics show that the null of the unit root is rejected for the indices and the IASI at levels with drift and trend. In other words, all the selected variables are of I (0) type series and therefore, it estimates the nonlinear Univariate GARCH class of models. The null hypothesis of the existence of unit root is rejected for advance-decline ratio, equity issue, put-call ratio, share turn overtrading volume, TV at the level itself self but variables like no of IPO, market turnover is stationary after first difference. With the help of Augmented Dickey-Fuller Test (Dickey and Fuller 1981) the stationary condition of data sets have been tested. The result of ADF presented in Table

5.2 is taken after analyzing the data with intercept and trend, with intercept and without intercept and trend. All data series are stationary at level I(0).

The stationary properties of the variables Sentiment index and excess return have been tested through the ADF test and are reported in Table 5.2. The results clearly show that both the Sentiment index and excess returns are stationary at level. The analysis has been started with estimating the OLS regression. It can be observed from that sentiment index positively influences market excess returns. When the sentiment index is decomposed into positive sentiment and negative sentiment, an asymmetric relationship has been observed. It is evident that while the positive sentiment index has a positive impact on the market excess return the negative sentiment index has a negative impact Similar findings are obtained when considered the changes in sentiment index. The results indicate that during the period of investigation when the change in investor sentiment turns to positive (negative) the market excess return also moves positive (negative) as well.

### 5.6.5. Principal Component Analysis (PCA)

The Principal Component Analysis is a set of methods to perform linear transformations of a large number of intercorrelated variables to obtain a relatively small number of uncorrelated components. Principal components (PCs) as linear combinations of the original variables. The first principal component is required to have the largest possible variance. The second has to be orthogonal to the first and have the second largest possible inertia. The rest of the components are computed likewise. The values of the new variables for the observations are called factor scores, which can be interpreted geometrically as the projections of the observations onto the principal components (Abdi and Williams 2010).

This approach facilitates analysis by grouping the data into smaller sets and to eliminate the problems of multi-collinearity between variables. The principal component analysis is similar to factor analysis, but it is an independent technique that is often used as the first step in factor analysis (Vogt 1993). Stevens (1992) also puts into relief the interest offered

by the principal component analysis as a technique for data reduction. The main objective of PCA is to summarize effectively as possible in single indicator information retained in the common set of indicators. The advantage of the composite index is that it reflects the moral of a very large sample of investors, both those TV, PCR, ADR, ST and No. of IPO. As a result, the relation lead-lag is taken into account in the construction of the composite index. It follows the same approach as Baker and Wurgler (2006) to avoid the problem of timing, because the indicators may reflect the same sentiment factor at different times.

**Table 5. 3 Principal Component Analysis**

| Number | Value | Difference | Proportion | Cumulative Value | Cumulative Proportion |
|---|---|---|---|---|---|
| 1 | 2.047553 | 0.509243 | 0.3413 | 2.047553 | 0.3413 |
| 2 | 1.53831 | 0.537019 | 0.2564 | 3.585863 | 0.5976 |
| 3 | 1.00129 | 0.221448 | 0.1669 | 4.587153 | 0.7645 |
| 4 | 0.779842 | 0.323185 | 0.13 | 5.366995 | 0.8945 |
| 5 | 0.456657 | 0.28031 | 0.0761 | 5.823652 | 0.9706 |
| 6 | 0.176348 | --- | 0.0294 | 6 | 1 |

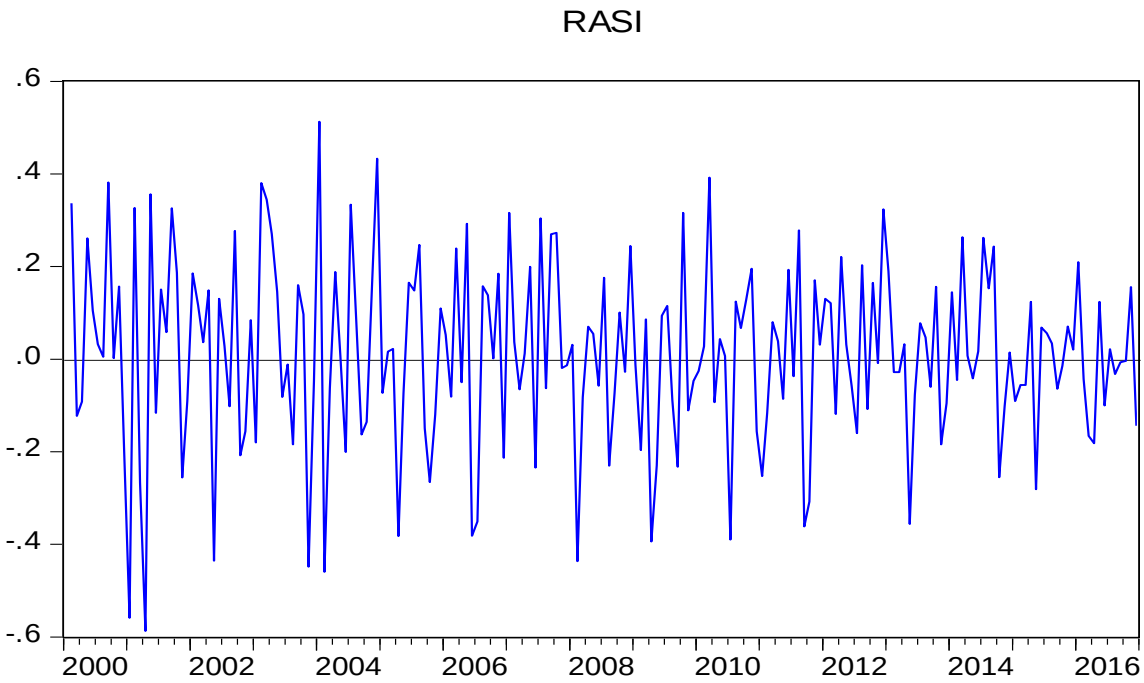



**Figure 5. 1Aggregate sentiment index**

### 5.6.6. Investors' Sentiment and Stock Market Volatility

Based on the scientific body of literature, Baker and Wurgler (2007); Brown and Cliff (2004); Baker et al. (2012) propose two investor sentiment indexes and the ways to construct the investor sentiment index. In the first step, study has taken 6 indirect measures of sentiment proxies to create an index taking the first principal component of these 6 indirect measures and the lagged components of these sentiment variables. Then the study has taken the principle component of 6 variables and its lagged values. The first principal component explains sample variance, and those factors capture much of the common variation. The descriptive statistics of first stage sentiment proxies, orthogonalize proxies, the correlation matrix of sentiment indicators with the market index. The cross-correlation matrix suggests that all sentiment proxies are correlated in the desired direction. This matrix suggests a common measure of investor sentiment explained by these all variables. Therefore the present study following Qiu and Welch (2006); Baker and Wurgler (2006);

Verma and Soydemir (2006) formulates Equation (1) and model the impacts of fundamentals of the market on investor sentiments as follows:

$$Sentit = \alpha + \beta_{\text{i}} \sum_{i=0}^{n} FUND^{\text{j}}{}_{\text{i}t} + \boldsymbol{\varepsilon_{\text{i}}\, t}$$

Equation 1

In Equationα0 is constant, γj is parameter needs to be estimated, Sentit is sentiment proxies in each regression. The fund represents the set of 10 explanatory macroeconomic factors and market-wide systematic risk factors as loading variables. εit represents the random errors obtained from each regression equation. The fitted values from the regression model explain the rational component of the investor sentiment index, whereas, the residuals capture the irrational component of sentiment index. It studies employ the first principal component on extracted residuals from equation (1). Each respective proxy's lead or lag is used in the procedure, and whichever variables lead value at or the lag value has a higher correlation with the first-stage index rescaling the coefficients so that the index has a unit variance, the study choose for the sentiment index. It follows the equation (2) procedure that leads to parsimonious sentiment index coefficients estimated using the first principal component of each of the 6 fundamental-orthogonalize sentiment proxy variables.

$$ASIt = \alpha + \beta 1\, ADR + \beta 2\, MT + \beta 3\, IPO + \beta 4 PCR + \beta 5\, ST + \beta 6\, TV + \beta 7\, TV \quad (1)$$

Where *α0* is constant.

$$IASI = 0.073ADR + 0.583MT + 0.031IPO - 0.498PCR + 0.158ST + 0.616TV$$

…… Equation 2

(IASI = Indian aggregate sentiment index, ADR =Advance equity ratio, MT=Market turnover, PCR=Put call ratio, ST= share turnover, TV= trading volume, IPO= No of IPO)

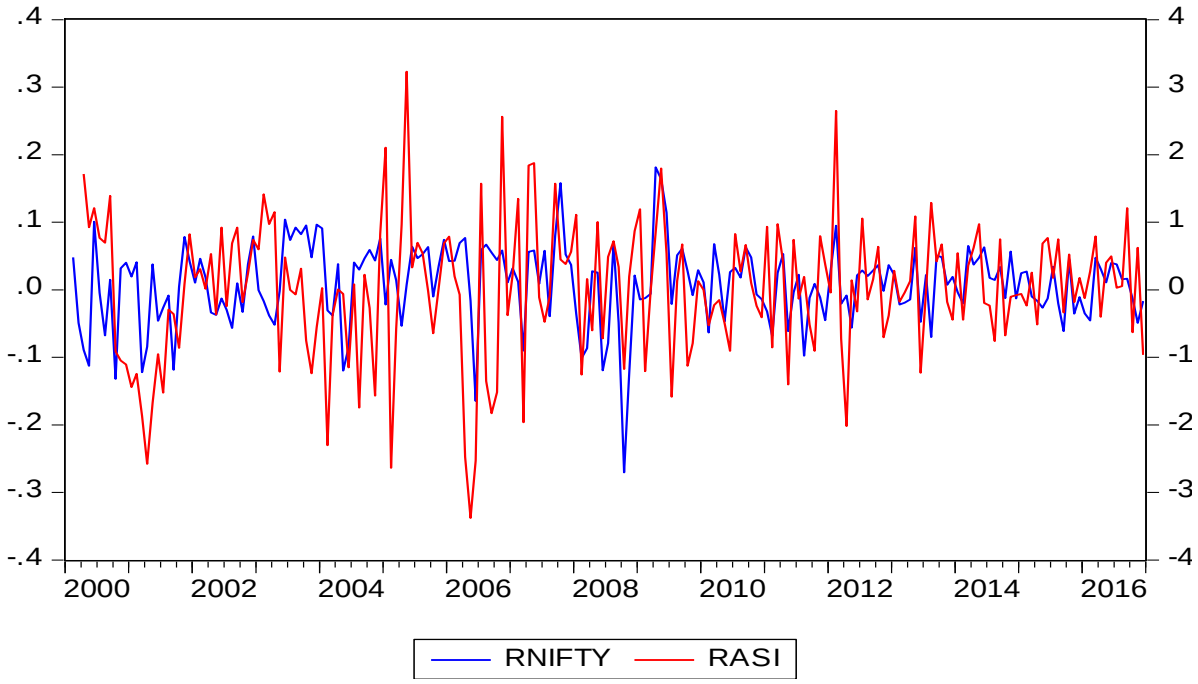



**Figure 5. 2 Sentiment and return in the stock market**

The graph indicates that the volatility of stock market return was moderate up to 2006 but the early symptoms of subprime crises 2008-09 increase the volatility excessively. This may be because of the outflow of funds into the capital market. This trend continued up until 2009. after that volatility went back to a moderate level. In addition to that other regional economic issues like European sovereign debt crises, Russian financial crises and oil price crises are also contributed to the volatility of stock prices in the Indian stock market.

**Table 5. 4 Volatility Estimation**

| Coefficients | Nifty | ASI |
|---|---|---|
| ω | 0.146978 | 0.007771 |
| α | 0.119091 | 0.210563 |
| β | 0.858200 | 0.612727 |
| Q (20) | 19.733 (0.475) | 27.084 (0.133) |
| $Q^2$ (20) | 10.078 (0.967) | 24.658 (0.215) |
| ARCH LM | 0.233(0.629) | 0.035(0.852) |
| SIC | -2.841263 | - |

*Source: Data analysis*

A GARCH (1,1) Model is used to estimate the volatility of Nifty and aggregate sentiment index. It has the capability to model the volatility than the conventional models. It analyzes the volatility characteristic of the data sets especially for financial data, it has a problem of heteroscedasticity of data set and volatility clustering, which limit the use of traditional models for analysis. The Volatility of Nifty and aggregate sentiment index NIFTY return data set shows an Autoregressive Conditional Heteroskedastic (ARCH) **(**Table 5.4) behavior which is the prerequisite for estimating the GARCH model. In the present study, it employs the comprehensive GARCH classes of models to extract the conditional volatility from investor sentiment index and stock returns of market portfolios. GARCH model is the most preferred model to capture the volatility symmetry in financial returns. The GARCH (1, 1) process with conditional normal distribution is the most popular

generalized ARCH specification in the empirical research. In this model, weights on past squared residuals decline geometrically at a rate, which can be estimated from the data. GARCH (1,1) model with a constant and lagged value of the nifty return.

**Table 5. 5 Heteroscedasticity Test: ARCH**

| | | | |
|---|---|---|---|
| F-statistic | 7.368708 | Prob. F(1,201) | 0.0072 |
| R-squared | 7.178850 | Prob. Chi-Square(1) | 0.0074 |

*Source: Data analysis*

The GARCH (p,q) model, introduced by Engle (1982) and Bollerslev (1986), can be expressed as follows

$r_t$ is the Nifty log return

$P_t$ is the current Closing Nifty

$r_t = c_0 + \gamma r_{t-1} + \varepsilon_t$

$\varepsilon_t \, | I_{t-1} \sim N(0, h_t)$

$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2$

$r_t$is the log Nifty return(the positive value of $r_t$ indicates the bullish trend in the market and negative value shows a bearish trend in the market. $\gamma$ is the coefficient of lagged the value of Nifty return ($r_{t-1}$). $c_0$ is the constant of the mean equation and $\omega$ is the constant in the variance equations, $\varepsilon_t$ error term. $I_{t-1}$ Shows that information available to the market participants. $\varepsilon_{t-1}^2$ is the ARCH term and $\sigma_{t-1}^2$ is the GARCH term, by increasing the number of ARCH and GARCH term model can be generalized to a GARCH (p,q) model. For a well-specified GARCH model $\omega$ >0, $\alpha$ >0 and$\beta \geq 0$.

**Table 5. 6 Estimation of GARCH result**

| **Variables** | **Coefficients** |
|---|---|
| $c_0$ | 72.05775 (0.000) |
| $\gamma$ | 0.293590 (0.0124) |
| **Variance equation** | |
| ω | 1.748239 |
| α | 0.295852 |
| β | 0.459324 |
| $\delta$ | 0.573892 |
| Q (20) | 27.084 (0.133) |
| $Q^2$ (20) | 24.658 (0.215) |
| ARCH LM | 0.035139 (0.8515) |
| SIC | 4.727727 |
| Hannan-Quinn criter | 4.669417 |
| Akaike info criterion | 4.629800 |

*Source: Data analysis*

The estimated result of GARCH (1, 1) model is presented in table 5.6. The coefficient of ARCH (α) and GARCH term (β) is different from zero and statistically significant. In addition to that sum of α+β is close to unity, it shows a high persistence of Nifty volatility (mean reversal process is very slow). The result of ARCH-LM test indicates the absence of further ARCH effect which means the model is capable of capturing the ARCH effect. The statistically significant coefficient of Q and $Q^2$ at $20^{th}$ lag indicates the absence of further autocorrelation in the model.

### 5.6.7. Conditional Variance

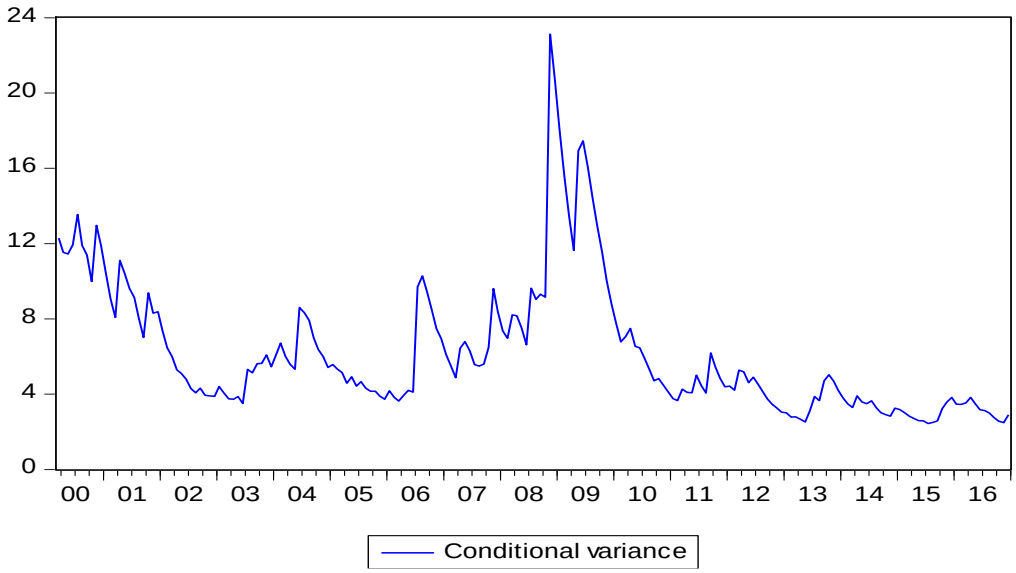



**Figure 5. 3 Conditional variances of the stock market return**

The conditional variance graph from the GARCH (1,1) Model shows the volatility of the NIFTY. Up to 2008 may volatility was high but the volatility is moderate as compared to the subprime crises period. During that period volatility increases exponentially and the trend continued up to February 2010. Later the market started behaving with low volatility

The constructed composite sentiment index is stationary at I(1) Granger Causality Tests between aggregate sentiment index and stock return is modeled for understanding the

leading and the lagging variables found that investors sentiment leads to the volatility of the market return(Table 5.6 ). But the volatility in the return does not cause sentiment.

### 5.6.8. Granger Causality Test

Granger Causality tests were performed to investigate the short-run causal relationship among the variables. Causality tests can be conducted in two different ways depending on the results of the long-run analysis. The Granger (1969) test is suitable for analyzing the short-run relationship if no integration exists among the variables. On the other hand, when the variables of interest are integrated, the standard Granger test is misspecified and the error correction strategy suggested by Engle and Granger (1982). The Granger test examines whether including lags of one variable has predictive power for another variable.

The Granger causality test was done to evaluate causality in the short-run relationship among the hypothesized variables. This test was deemed appropriate as it checks for the joint significance of each variable and its lags. According to the Granger causality test (1969), a time series *X* is said to be causing *Y* when past values of *X* can predict future values of *Y*. In this case, we can say that *X* Granger causes *Y*. The Granger test is valid only when there is no long-run equilibrium relationship between the examined variables. The Granger Causality Test results are presented in Table 5.7.

The concept of Granger causality test examines the dynamic linkage between the two series. A time-series *t x* Granger-causes another time series *t y* if series *t y* can be predicted with better accuracy by using past values of *t x* rather than by not doing so. The empirical analysis of the causality between sentiment index (S*ent*) and aggregate stock indices (SI).

**Table 5. 7 Granger Causality Test**

| Hypothesis | F-Statistic | Prob. |
|---|---|---|
| LOG_RETURN does not Granger Cause RASI1 | 0.61989 | 0.5391 |
| RASI1 does not Granger Cause LOG_RETURN | 2.64281 | 0.0737* |

*Source: Data analysis*

**significant at 10% level*

## 5.7. Conclusion

This study develops a comprehensive index to measure the sentiment of the Indian stock market. The index is a linear combination of six proxies whose weights are obtained via the principal component method. The proxies under consideration are the short-selling volume. Our sentiment index is positively associated with market turnover, Market turnover, share turnover, trading volume, number of IPO. A conducive environment for proper financial education facilitates better use of information relevant to investment decisions. One priority of policymakers is to enhance the effectiveness of financial education. Integrating investor psychology in the development of financial education is an effective way to enhance financial education. Creating materials relevant to target investor group that takes into account the differential preference and psychology, developing analytical tools to identify investor's needs and biases and reinforcing communication levels to link education methods to the immediate application are some key areas of focus for policymakers. Garcia (2013) suggests a similar policy suggestion. This research is also important for policymakers who aim at stabilizing investor sentiment to control market volatility. Also, this research is important for portfolio managers who take their investors' sentiment into account when assessing stocks.

# CHAPTER 6

# MACROECONOMIC ANALYSIS

## 6.1.Chapter Overview

This chapter examines empirical evidence on the relationship between macroeconomic variables and stock market volatility. Section 6.2 deals with the introduction. Section 6.3 gives data and methodology. Section 6.4 discusses statistical methods for data analysis and finally section 6.5 conclusion

## 6.2.Introduction

The Indian security market has attained incredible stability and attracted a high level of foreign investors investment. The stock market movement is greatly sensitive to variation in the expectation and changes in fundamental economic activities. It occurred in both developing and developed countries (Bernanke and Gertler 2001). As an emerging market, India has a high potential and a growing economic system. In the last two decades 'Indian economy has shown significant performance and the stock market has a vital role in the growth of commerce and industry of the country. Before investing the funds, the investors watch carefully for the stock market performance and they observe the stock market. For the developing and flourishing of the stock market, there is several strategies are implemented. This means that the emerging economy has a volatile characteristic in the stock market (Engel and west 2005).

The macro-economic variable is anticipated to the rapid growth of the market and significantly related to the volatility estimation (Thenmozhi and Nair 2014). The major findings of the research are that the emerging market return and the volatility are great compared to other well-developed countries. The research also found that the emerging market return for the high volatility is caused by local factors, the trend of volatility is to

be influenced by several factors such as economic, social, political (Aggarwal et al. 1999). According to Fama (1981), there is a comprehensive group of macroeconomic variables that influence the stock prices in the share market of any country. Some existing studies examine the development of the macroeconomic variables and stock market volatility. It can study by Wang (2013); Oseni and Nwosa (2011); Beetsma and Giuliodori (2012). The linkage between stock price and the macroeconomic variable has been the focus of both empirical and theoretically for the last century. There are a number of the researcher to test empirically and different approach of the econometric model (Fama 1965; Ross 1976; Flannery and Protopapadakis 2002). These studies have focused on the wide range of influences on the macro variable and stock prices. Also, this study uses several macroeconomic factors that are representative of Indian market fundamentals. following the literature review five variables are chosen for their theoretical significance, empirical significance in the asset pricing. Economic growth is measured as the monthly change in the Industrial Production Index (IIP) (Fama 1970); Short-term interest rates (Campbell 1991) measured as the yield on the 1-month Treasury bill. Inflation (Fama and Schwert 1977; Sharpe 2002) measured as the monthly changes in the wholesale price index and r is the exchange rate fluctuations (Elton and Gruber 1991) measured as the changes in the USD- INR nominal exchange rate. The term of trade measured as the monthly ratio between the export price index and the import price index.

Recently, a negligible amount of research has been conducted for macro-economic variables and the Indian stock market (Pethe and Karnik 2000: Ahmed 2008; Pal and Mittal 2011). The relationship of major macro factors could vary from market to market, in different sample periods and also at a different frequency of the data. Thus, more in-depth studies are needed to understand the macroeconomic variables that might influence the Indian stock market. Moreover, a country like India is particularly important to study such a relationship since it is one of the fastest-growing economies. Furthermore, the capital market has undergone tremendous changes after the adoption of liberalization policy and it became more open to international investors.

### 6.3.Data and Methodology

The present study investigates the relationship between stock market volatility and how the macroeconomic variables are impacting stock market volatility. As a result, the dataset utilized in the present study consists of monthly observations for Indian stock indices. This study used monthly different monthly data sets and the time series data on stock market return and different macroeconomic variables ranging from June 2000 to December 2016 were used to estimate the model.

For estimating the volatility model, this study is applied to the methodology ARCH family model, especially the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model to capture the persistence of volatility. Since it would be almost impossible to incorporate every potential aspect to explain the stock market behavior, limit to select five macroeconomic variables namely nominal bilateral Exchange Rate(ER), Wholesale Price Index (WPI), Index of Industrial Production (IIP), Net Foreign Institutional Investment (FII), Term Spread(TS). The selection of variables for the present study is based on the existing theoretical propositions and empirical evidence. Data is obtained from the National Stock Exchange official website and Handbook of Statistics on the Indian Economy provided by (Reserve Bank of India 2017).

Non-availability of monthly GDP data is compensated by including IIP as a proxy for GDP with base year 2010=100. Inflation is one of the key variables to influence the stock market behavior negatively, measured as WPI with 2010=100. Following (Campbell 1991) this study considered the spread of ten years Government Treasury bill and one-year Government Treasury bill because, the interest rate is considered as one of the keys determining variables in the stock market behavior. Also, FII is incorporated in the model because of its inevitability on the liquidity position of the stock market. As a multifaceted factor, the exchange rate influences the stock market negatively i.e. exchange rate depreciation strengthens the stock market. Since it would be almost impossible to incorporate every potential aspect to explain the stock market behavior, the study limited

its scope to five macroeconomic variables namely industrial production index wholesale price index money supply, exchange rate, and short-run interest rate.

The selection of variables for the present study is based on the existing theoretical propositions and empirical evidence. IIP is used as a proxy for real output, WPI is used to incorporate the inflation rate, and the three-month treasury bill rate is used to incorporate the short run risk-free interest rate. As already discussed, these variables are extensively used in the previous literature to capture macroeconomic activities. This present study investigates the relationship between macroeconomic variables and stock market volatility in the Indian stock market. As a result, the dataset utilized in the present study consists of monthly observations for stock indices NIFTY and a set of macroeconomic variables, including exchange rate fluctuation Wholesale price index Index of industrial production Net foreign institutional investment and Term spread. Table 6.1 shows the descriptive statistics for the variables used in the study.

**Table 6. 1Descriptive Statistics**

| | **CPI** | **EXR** | **FII** | **IIP** | **Term spread** |
|---|---|---|---|---|---|
| **Mean** | 92.868 | 50.124 | 1437.737 | 84.457 | 7.070 |
| **Median** | 80.435 | 46.810 | 1192.750 | 89.737 | 7.314 |
| **Maximum** | 159.170 | 68.238 | 6252.975 | 122.821 | 10.813 |
| **Minimum** | 52.980 | 39.374 | -665.629 | 47.287 | 4.007 |
| **Std. Dev.** | 34.035 | 7.803 | 1375.847 | 24.032 | 1.538 |
| **Skewness** | 0.568 | 1.005 | 1.166 | -0.162 | 0.024 |

| | | | | | |
|---|---|---|---|---|---|
| **Kurtosis** | 1.874 | 2.739 | 3.990 | 1.548 | 2.388 |
| **Jarque-Bera** | 21.747 | 34.923 | 54.531 | 18.802 | 3.203 |
| **Probability** | 0.000 | 0.000 | 0.000 | 0.000 | 0.202 |

*DEXR=Exchange rate, DIIP =Index of industrial production, DFII =Foreign institutional investment, DWPI =Whole sale price index, TS= Term spread*

### 6.4.Statistical Methods for Data Analysis

The present study employs the time series data analysis technique to study the relationship between the stock market volatility and the macroeconomic variables. In this study, the volatility in stock market returns and macroeconomic variables is estimated by using GARCH models. The GARCH models introduced by Bollerslev (1986) have been the most commonly employed class of time series models in the recent finance literature for studying volatility. The appeal of the models is its ability to capture both volatility clustering and unconditional return distribution with heavy tails. Meanwhile, policymakers pay attention to the situation of the stock market that can be regarded as a leading indicator of future macroeconomic activity. They can better control the direction, magnitude, and stability of the economy by adjusting macroeconomic variables if the relationship between stock returns and economic activity has predictive power to stimulate the growth of the economy. In a non-stationary time, series analysis, employing regression analysis provide a spurious result. Hence the data series must follow the basic assumptions of time series data i.e. it should be stationary.

According to Gujatati (2003) a variable is stationary if the mean and variance should be constant over time and the value of covariance between two time periods depends only on the distance between the two-time period and not the actual time at which the covariance is computed. Statistically the existence of unit root is signifying the non-stationarity of the

series. The most popular and widely practiced test for stationarity is Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) test which is used in this study. Some variables are stationary at I(0) and other variables are stationary at I(1). Non-stationary variables are converted to stationarity after taking the first difference.

**Table 6. 2 Unit Root Test**

| **Items** | **ADF Statistics** | | | **PP Statistics** | | |
|---|---|---|---|---|---|---|
| DEXR | 10.2884*** | 1% level | 3.4627 | 10.2832 | 1% level | 3.4636 |
| | | 5%level | 2.8757 | | 5%level | 2.8760 |
| | | 10%level | 2.5744 | | 10%level | 2.5746 |
| DIIP | 14.0760*** | 1% level | 3.4629 | 21.3789 | 1% level | 3.4636 |
| | | 5%level | 2.8758 | | 5%level | 2.8760 |
| | | 10%level | 2.5744 | | 10%level | 2.5746 |
| DFII | 9.7558*** | 1% level | 3.4624 | 10.1088 | 1% level | 3.4627 |
| | | 5%level | 2.8755 | | 5%level | 2.8757 |
| | | 10%level | 2.5743 | | 10%level | 2.5744 |
| DWPI | 8.6548*** | 1% level | 3.4627 | 8.7663 | 1% level | 3.4646 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 5%level | 2.8757 | | 5%level | 2.8765 |
| | | 10%level | 2.5744 | | 10%level | 2.5748 |
| Term spread | 3.3368** | 1% level | 3.4626 | 3.0393 | 1% level | 3.4627 |
| | | 5%level | 2.8756 | | 5%level | 2.8757 |
| | | 10%level | 2.5743 | | 10%level | 2.5744 |

*Source: Data analysis*

The estimation of the GARCH model involves the joint estimation of a mean and conditional variance equation. The conditional mean equation, is an autoregressive process of order *k* (AR(*k*)). Parameter λ0 is the constant, *k* is the lag length, εt is the heteroskedastic error term with its conditional variance is the conditional variance equation specified as the GARCH (*p,q*) model where *p* is the number of ARCH terms, and *q* is the number of GARCH terms. Theoretically, financial data follow a random walk and the mean and variance of the series vary over time. Moreover, the small movements follow further small movements and big movements follow further big movements, this volatility clustering behavior always shows the evidence of ARCH effect.

According to (Asteriou, and Kavetsos, 2006) the result of Lagrange Multiplier (LM) test (for ARCH) follows a chi-square distribution which directs to reject the null hypothesis of no ARCH effect and accept the alternative of the existence of ARCH effect. In addition to that leptokurtic movement of the return series also ensure the presence of ARCH effect. Several kinds of literature show that (Baillie and DeGennaro 1990; Bera and Higgins 1993) a simple GARCH model is parsimonious and generally gives significant results.

The GARCH (p,q) model, introduced by Engle (1982) and Bollerslev (1986), can be expressed as follows

$$r_t = c_0 + \gamma r_{t-1} + \varepsilon_t$$

$$\varepsilon_t \, | I_{t-1} \sim N(0, h_t)$$

$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2$$

The GARCH (p,q) model, introduced by Engle (1982) and Bollerslev (1986), can be expressed as follows. where $r_t$ represents the first difference between stock indices and macroeconomic variables at time t. εt t–1 denotes the error term concerning the information at time t–1 and is assumed to be normally distributed. Equation (2) represents the variance equation, while ht is the conditional variance of stock indices and macroeconomic variables at time t. p is the order of GARCH terms and q is the order of the ARCH term.

Therefore, this study uses GARCH (1,1) models to estimate the predicted volatility of the stock market returns and all macroeconomic variables (industrial production, exchange rate, inflation rate, wholesale price index, Term spread) being studied. Table 6.3 presents the parameter estimates and their corresponding p-value of the GARCH (1,1) model for stock market return and five macroeconomic variables being studied. It can be seen THAT the Exchange rate, net FII, Wholesale price index, wholesale price index, term spread follows a GARCH (1,1) model. The Box–Ljung (Q) statistic of the residuals at 20 lags shows no evidence of autocorrelation in the ARCH/GARCH residuals. However, the results from $Q^2$ tests show there is no autocorrelation up to order 20 for standardized residuals squared in all models. Therefore, it is concluded that the fitted ARCH/GARCH model is reasonably well specified. The main factors include the Exchange rate, Net FII, Consumer price index, Wholesale price index, Term spread. Descriptive statistics are the basic features of data obtained in the study.

$$R_t = C_0 + \gamma_1 EXR_t + \gamma_2 IIP_t + \gamma_3 WPI_t + \gamma_4 FII_t + \gamma_5 LT_t + \varepsilon_t$$

$$h_t = C_0 + \delta_1 EXR_t + \delta_2 IIP_t + \delta_3 WPI_t + \delta_4 FII_t + \delta_5 LT_t + \alpha_{t-1}^2 + \beta h_{t-1}$$

The results of the mean equation show the relationship between macroeconomic variables and stock market returns. All variables show the theoretically correct sign. The negative coefficient of the exchange rate shows the depreciation of the rupee negatively influences the stock market. Similarly increases in inflation create a pessimistic behavior in the market. On the other hand, the increase in industrial production (a proxy for economic growth) boost the capital market activities. Similarly, an increase in capital inflow boost up the market performance and contribute to market growth. The positive coefficient of interest rate shows that higher interest rates attract more foreign capital and accelerate market activities.

**Table 6. 3 Estimated Result (Mean Equation)**

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.004858 | 0.007379 | -0.658326 | 0.5103 |
| DEXR | -1.091958 | 0.289191 | -3.775905 | 0.0002 |
| DIIP | 0.448490 | 0.134749 | 3.328343 | 0.0009 |
| DWPI | -0.718442 | 0.560534 | -1.281711 | 0.1999 |
| LFII | 0.091724 | 0.022117 | 4.147232 | 0.0000 |
| LTS | 0.023823 | 0.032480 | 0.733484 | 0.4633 |

*Sources: Data analysis*

The results show that the rise in the index of industrial production, foreign institutional investment and term spread has a positive effect on stock prices. The coefficient of the

index of industrial production, foreign institutional investment and term spread is statistically significant and positive at 5%, 1% and 10% respectively. The findings of the study are consistent with (Fama 1981; Mukherjee and Naka 1995; Maysami and Koh 2000) who have found a negative correlation between inflation and stock prices. The negative relationship may be since inflation causes a decline in the value of money. Consequently, the purchasing power of money decreases, and leads to a negative effect on saving and investment activities. Which further causes negative capital formation. The coefficient of the index of industrial production, and foreign institutional investment were positive at 0.448 and 0.092 respectively with approximately statistically significant. By contrast the estimated coefficient of term spread was positive 0.024 but it is not statistically significant. These findings concluded that foreign institutional investment and industrial production have a significant effect on stock market volatility.

**Table 6. 4 Estimated Result**

| | Coefficient | Std. Error | z-Statistic | P-value |
|---|---|---|---|---|
| ω | 0.00107 | 0.000354 | 3.021522 | 0.0025* |
| α | 0.190149 | 0.116893 | 1.626687 | 0.0038* |
| β | 0.454021 | 0.183749 | 2.470875 | 0.0135** |
| $\delta_1$ | 0.014562 | 0.013517 | 1.077296 | 0.2813 |
| $\delta_2$ | -0.017337 | 0.008888 | -1.95068 | 0.0511*** |
| $\delta_3$ | 0.058676 | 0.021424 | 2.738843 | 0.0062* |
| $\delta_4$ | -0.001249 | 0.000743 | -1.680593 | 0.0928*** |

| | | | | |
|---|---|---|---|---|
| $\delta_5$ | -0.00109 | 0.000896 | -1.216125 | 0.2239 |
| Q (20) | | | 27.826(0.114) | |
| $Q^2$ (20) | | | 18.312(0.567) | |
| ARCH LM | | | 0.097742(0.7549) | |

*Sources: Data analysis 1% *,5%**,10%****

*g1=Exchange rate, g2 =Index of industrial production, g3=Wholesale price index*

*g4= Foreign institutional investment, g5= Term spread*

The results of the variance equation show the impact of macroeconomic variables on stock market volatility. Depreciation of the rupee exchange rate increases volatility in the stock market. Similarly, inflation also increase stock market volatility. But the economic growth, foreign capital inflow and interest rate hike reduce the market volatility. These variables make the market optimize by brings more capital and ensuring liquidity. The sum of $\alpha+\beta$ shows the persistence of volatility, which is moderately high in our model. It shows that the speed of adjusting to the long-run is low and the divergent creates a new equilibrium.

The results show that the rise in inflation and depreciation of the exchange rate has a positive effect on stock prices. The real exchange rate is positively influencing stock market volatility which is based upon the stock market development. This relationship is very helpful because the devaluation of the home currency is increasing for the export, therefore increases the dividend payoffs for firms and the cash flow relies on exports in India. It is also helpful for the portfolio managers interested in or investors trying to hedge against foreign exchange risk or global asset allocation. the exchange rate should be managed carefully by keeping in view that the elasticity of imports and exports may strengthen the stock market. The coefficient of inflation and exchange rate is statistically

significant.The findings of the study consistent with (Ioannides et al. 2005) for Inflation and (Mukherjee and Naka 1995) for the exchange rate.

### 6.5.Conclusion

This study estimated the result of the indicators of macro-economic variables and stock price using monthly ranges from the year 2000 to the year 2016. The monthly data set selection used to capture the short-run fluctuation in the variables. Most of the study in the Indian context is carried on annual data; hence this study provides valuable information on the dynamic relationship of stock prices and macroeconomic variables. The extensive literature review of the above macroeconomic variables is selected for the study. The role of the stock market in the economy is to raise capital by channelizing savings into investment. This empirical report performs the necessary analysis to answer whether changes in the identified macroeconomic variables affect stock prices of the Indian stock market. The research employs a GARCH Model to examine these relationships.

The result suggests that FII and promoting trade openness can facilitate easier and further investment flow. Foreign capital inflow is an important factor for the development of the stock market in India. Hence, more liberalized policies must be formulated to confirm more liquidity in the market wholesale price index has a negative impact on stock prices. A suitable policy should be formulated for balancing the inflation to achieve a broader economic objective. This study suggests that investors in making better portfolio decisions and suitable policy measures should take to control inflation which ultimately helps the control of volatility of the stock market. By implementing appropriate fiscal measures and suitable monetary policies, authorities should manage inflation of inflation to promote sustainable growth of the stock market. Thus, this study suggests that the financial regulators and policymakers should consider the effect of these fundamental macroeconomic variables while formulating fiscal and economic policies.

# CHAPTER 7

# FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

## 7.1.Chapter Overview

The chapter presents the summary of findings, conclusions, and recommendations of the research undertaken. Section 7.2 summarizes the main findings of the study. Section 7.3 provides the conclusions and section 7.4 gives recommendations. Section 7.5 discusses the theoretical and practical implications of the study. The limitations of the research and direction of future research are discussed in sections 7.6 and 7.7 respectively and the chapter ends with section 7.8 with the final word.

This empirical research has been carried out to know the various factors that affect Investor sentiment which leads to investment decision making of individual investors in India. The study also reveals that the construction of the investor sentiment index and macro-economic variable lead to stock market volatility in India. The study was based on both descriptive and exploratory approach. The study involved the characteristics of associate and description of phenomena with the individual investor's decision making associated with investor sentiment and its variables. The study is based on deductive as well as inductive arguments that established a clear theoretical perspective preceding the data collection. The hypothesis has been empirically identified and tested. Data were collected by two of the following methods, primary data was collected from five different Indian states and the secondary data collected from the national stock exchange, SEBI and RBI websites. In the analysis, descriptive and inferential statistics were used. The study was able to recommend a model for investor sentiment and investment decision making of individual investors' in the Indian stock market.

## 7.2.Main findings of the study

### 7.2.1. Major findings of the study are:

- **Herding behavior**: Results indicate that the hypothesised relationship between herding behavior and market factors are statistically significant (β= 0.32, ρ= <0.01 level). Hence the hypothesis H1 is supported. Even though the relationship was significant, results indicated that herding behavior significantly influences the investor sentiment. Compared to the previous study (Tran 2007) the present study has the β- value of 0.32 in investment decision making context. However, herding emerged as the major contributing factor of investor sentiment towards investment decision making and supports the study of (Poshakwale and Mandal 2014) contrasting in the result of (Lin 2011).
- **Market factors**: Market factors has a significant positive effect on investor sentiment and investment decision making (H3: β= 0.29, ρ= <0.01 level). Hence the hypothesis H2 is supported. However, market factors emerged as the major contributing factor of investor sentiment towards investment decision making. In this case, the market factor includes the market information, the price changes of stocks in the market, and the past trends of stocks. These market variance of investor sentiment is explained by herding behavior are very important to the investors and usually taken under their considerations for making investment decisions.
- **Media**: The relationship between media and investor sentiment is found to be positively significant (β=0.36, ρ= <0.01). Thus the hypothesis H3a is accepted. However, media has emerged as the major contributing factor of investor sentiment towards investment decision making Hence it is concluded that media has an essential role in investor sentiment towards investment decision making.

- **Internet:** The relationship between internet factor and investor sentiment towards investment decision making found to be positively significant (β=0.13, ρ= <0.01). Hence the hypothesis H3b is supported. Internet factor is the vital factor for investor sentiment and investment decision making. The result is in contrast to the findings of (Barber and Odean 2001) who demonstrated that the rise of the internet dramatically changed the way people make investment decisions.
- **Social interaction**: The relationship between social interaction towards investment decision making found to be positively significant (β=0.26, ρ= <0.01). Thus the hypothesis H3c is confirmed. Even though the relationship was significant, results indicated social interaction influences investor sentiment. The result is similar to the findings of (Shive 2010). The present study has the β- value of 0.26 in the investment decision making context. However social interaction emerged as the major contributing factor of investor sentiment towards investment decision making.
- **Advocate recommendation**: The result indicates that the hypothesised relationship between advocate recommendation is statistically significant (β= 0.28, ρ= <0.01). Hence the hypothesis H3d is supported. Compared to previous studies (Bennet 2012) on investor sentiment towards investment decision making of individual investors (0.128). The present study has the β- the value of 0.280 in the individual investor context. Results reveal that advocate recommendation factors (i.e. friends/family have more knowledge about investing, professional's advice while making equity Investment, opinions of the firm's majority stockholders, individual stockbroker recommendations, colleagues recommendation frequently invest in equities) have significant influence. These results corroborate earlier study results of (Bennet et al. 2012; Sultana and Pardhasaradhi 2012) but contradict with (Al-Tamimi 2006). However, advocate recommendation is the major contributing factor of investor sentiment towards investment decision making, in the present study and supports the study results of (Shanmugham and Ramya 2012) regarding

investment decision making. However, advocate recommendation emerged as the major contributing factor of investor sentiment towards investment decision making in the present study.

- **Investor sentiment and investment decision making:** it showed that the relationship between investor sentiment and investment decision making is found to be positively significant ($\beta$=0.30, $\rho$= <0.01 level). Hence the hypothesis H4 is supported. This result is in line with the previous study (Metawa et al. 2019). An earlier study shows that investor sentiment is significantly affected by investment decision making ($\beta$ =0.65). Hence it can be concluded that the proposed model has significantly affected investment decision making.
- **Investor sentiment index and stock market volatility**: The result shows an asymmetrical relation when the sentiment index is broken down into positive and negative sentiment. The negative sentiment index hurts excess returns, but the positive sentiment index has a positive effect. This means that when investors are more optimistic about the market, their overwhelming optimism results in uncertainty that makes them even more likely to invest.

### 7.2.2. Demographic Factors

a) **Gender**: The study revealed that 68 percent of the respondents were male and 32 percentages were female. In the capital market men are more liable to investment than women, which demonstrates that men are investing more.

b) **Age**: Age classification of the respondents shown that 36.07 percent of the respondents belong to the age group of 25-35 years, the respondent between 28.28 percent and12.02 percentage belong to the age group of 36-45 and 46-55 years and 16.12 percent belonged to the age group above 55 years.

c) **Marital Status**: 72.54 percentage of investors are married and 27.46 percentage of investors are not married. The married investors view the investments for their

future requirements whereas unmarried sample investors do not show much interest to invest in the equity investment.

d) **Educational Qualification**: The education level of the investors survey revealed that highest percentage of the respondents was 27.46 percentage, they belonged to graduation, a second higher percentage of respondents was 24.18 percentage they belonged to postgraduate, 20.08 percentage were to others and 16.12 percentage belonged to 12th Standard and nearly 12.16 percentage were below 10th.

e) **Occupation:** Survey revealed that the occupation of the respondents shows that the majority (31.28 percent) of the respondents were included in the category of private employees. 20.36 are government employees, 19.95 were professionals. The remaining respondents worked in under the business and retired.

f) **Income**: The average monthly income of the members is categorized into five groups as stated by the respondents 10-14 lakhs and 15-19 lakhs in the highest income groups (20.36 percent). 5-10 lakh group are (27.19 percent), Above 20 lakhs are (12.30 percent), and below 5 lakhs respondents are (19.81 percent). On the income note, most of the investors belonged to the annual income group in the range of 15-20 lakhs (35 percent).

### 7.3.Conclusion

Although India has a very high savings rate, Indians are low investors. Despite the abundant investment opportunities, financial instruments have become ever more complex and saving and investment decisions have become extremely difficult. Although the traditional theory of finance claims that people are rational and make maximum use, people are investing in a way that is not rational. There have been few systematic studies to examine the factors which influence investor sentiment and investment decision making and stock market volatility of the individual investors. Based on the major substantive findings from the research on the investor sentiment of investors, about the study objectives, the following conclusions were taken.

The present studies the factors which are affecting investor sentiment and investment decision making of Indian individual investors. The major factors like herd behavior, market factors and awareness factors (media, internet, social interaction and advocate recommendation). The data collected from primary and secondary sources. The primary data provides a real-time understanding of the psychology of the investors.

On the other hand, the indirect method for measuring investor sentiment and stock market volatility. In this study monthly data of Nifty index from 2000 to 2016 were used. For stationarity of the time series checking, Augmented Dickey-Fuller(ADF) test used. The statistical test LJung Box Q used in residual terms to know the serial correlation. ARCH – LM test for residual arch impact. Granger Causality Test used in time-series data such as stock prices and investor sentiment index to know cause and impact relationship. In time series analysis of data, the GARCH model was used to know the stock price and volatility estimation.

### 7.3.1. The dimension of the investor sentiment of the individual investors

The literature review recognized various investor sentiment dimensions by various authors. This research focused on the three-dimensional structure of investor sentiment, based on the contributions of various researchers. The three dimensions were herding behavior, market factors and awareness factors. The research gap identified that the dimensions of investor sentiment and investment decision making of the individual investors and the construction of the investor sentiment index lead to stock market volatility. Few researchers suggested the three factors influencing investor sentiment and the construction of the stock market volatility of the Indian stock market.

For the study, it was decided to apply the quantitative research method. The strength of this study is the sample size of 732 investors. The instrument provided to individual participants was measured on five points Likert scale. Stratified sampling was used for the study and

data was analyzed using ANOVA, Chi-square and structural equation model using SPSS and Warp PLS.

The survey findings showed that demographic factors influence Investment decision making of individual investors. It has been found that married, younger investors (age 26-35) are more at risk than others. While intermediaries agree that demographic variables affect investor sentiment and investment decision making, they are also divided as whether education, income and occupation affect investment decision making.

### 7.3.2. Investor sentiment index and stock market volatility

This study provides a comprehensive index to assess the investor sentiment of the Indian stock market. The index is a six-proxies of the linear combination with weights acquired by the principal component method. The integration of investment psychology into financial education growth is an efficient way of improving financial education. Creating appropriate materials for the target group of investors that covers the differential, preferential and psychological aspects, creating analytical instruments to identify the requirements and bias of investors and strengthening the communication level to connect the educational technique with instant implementation are important policy areas. The intention is to stabilize the investor's behavior to regulate market volatility. This study is essential for portfolio managers, who take account of the sentiment of their investors in stock assessment and risk avoidance. For the construction of the investor sentiment index was analyzed GARCH Model and Ganger Causality test

## 7.4.Recommendations

In recent years, behavioral finance is becoming an integral part of the decision-making process because it heavily influences the investor’s performance. Understanding behavioral finance will help the investor to select a better investment instrument and they can avoid repeating the expensive error in the future. They can improve their performance

by recognizing their biases and errors of judgment to which we are all prone. The main issue of studying behavioral finance is how to minimize or eliminate the psychological biases in the investment decisions of the investors. After an extensive study of the literature on behavioral finance, it is believed that its perfect application could make a successful investor who commits fewer mistakes. Several psychological and behavioral factors influence investors in decision making. Various safeguards are needed to control error and psychological roadblocks while investing in the stock market. A disciplined trading strategy is required to control these mental roadblocks to all types of investors.

1. **Suggestions-to Investors:**

- It was found that investors involved in the survey when average or low in overall investor knowledge. These investors must be aware of the mechanism of the market and their behavior. The major recommendation for investors, therefore, is to constantly try to raise their knowledge.
- The recommendation for the factor from experts has been shown to have a strong impact on overall stock and other investment preferences. This fact shows that individual investors are completely dependent on factors other than their own emotions. The study proposes that individual investors expand their relationship with financial advisors and others to obtain more information and expertise in investment decisions.
- Any original information from a company or growth of the economy must be provided quickly to equity investors. There is, therefore, a need for adequate education in allocating funds between different investment horizons for investors. There is valuable information for individual investors to businesses operating in the economic industry, such as mutual funds, insurance firms, financial intermediaries, which enables them to make appropriate investment decisions.
- Studying the investor sentiment and reflecting on their decisions will probably assist in a better comprehension of how emotions affect them and make economic

decisions in uncertain conditions. Investors must either have financial literacy or expert decision support while investing their heavy assets.

- It should be reviewed regularly for both to recognise their knowledge of behavioral characteristics and to enhance financial market decision-making to decrease the probabilities of poor decision making. This can assist investors in making rational decisions at the stage
- Herding bias showed the greatest effect on the investor conduct, showing that investors were not mature and lacked credible data to demonstrate the need for each investor to select a good source of investment data for their investment decision. For this purpose, individual investors can create groups to help each other in the search for reliable stock market information to overcome this bias. Through the interaction of several investors, good investment outcomes are increased and there is less importance of allocation and risk reduction.
- The result offers valuable insight for risk diversification in the Indian stock market. As the stock returns various industries in similar economic conditions are different, investors must analyse the nature of the industry before making an investment decision. The results can help investors extend their understanding of the stock returns as well as macroeconomic factors.

**2. Investment Advisors and brokers**

- A favorable economic education framework promotes the better use of investment decision-making data, improving the efficiency of financial education is a key concern.
- The financial advisors can gain a better grasp of their clients' psychology while structuring their portfolios. Understanding the clients' psychology would strengthen their relationships with their clients considerably.
- For the study, investors were found to have very little awareness of the individual investment decision-making process. Thus, the investors are suggested to increase their awareness of their behavioral biases on the market mechanism.

- In the field of behavioral finance, this study is influenced by different extraneous factors such as newspaper, media, analyst recommendation, and internet, etc. Therefore, a suitable method is to be followed while taking an investment decision.
- Information should be presented commonly. Hence aggregated, a well-diversified portfolio is presented for the individual investor.
- It should be conscious and assist them in making effective and efficient decisions on the macroeconomic variable of the stock market.
- It is an evaluation to improve the general portfolio structure, which generally leads to a better strategy for risk diversification and a better return.
- This study helps portfolio managers and investors to make efficient investment decision making because the relationship between stock prices and macro-economic variables provides a suitable understanding of the structure of the portfolio and improved the overall level of the portfolio design. This will lead to a suitable strategy of risk diversification, for investors to get more returns. Hence this study significantly influences the portfolio managers and investors.

### 7.5. Theoretical and practical implications of the study

The thesis sheds light upon the relationship between factors affecting investor sentiment which is an influence on the investors' decision-making and stock market volatility of the Indian stock market. There are very few studies exploring the effects of investor sentiment dimension in the Indian stock market.

The investor needs to have the proper education on different horizons of investment and allocation of the resources. Investors should be given training and awareness on behavioral factors so that they show substantial improvement in decision-making and can avoid bias. If the investor has proper knowledge about the stock, they can avoid financial losses and make proper investment decisions. Providing proper training will help to achieve the important improvement of the decision-making. The development of financial education

mainly affects investors' psychological factors. This study provides practical insights to individual investors in the field of behavioral finance. Thus, the findings of the study would be beneficial to individual investors' who are either planning to invest or already invested in the stock market.

Investors need to be grouped based on their psychology and their preferences. Such categorization helps in identifying analytical tools for investor biases and needs. Garcia (2013) proposed a similar idea for the policymakers. The studies on investment decision-making and biases would help policymakers understand the extent and manner in which individual investors get influenced by emotions under uncertainty while making financial decisions. The study describes the effect of a deviation in herding and awareness factors on the investment decision. Herding may motivate the investor for excessive risk-taking that may create excessive volatility in the market. The policymakers should strive to increase investor awareness and availability of quality information, thus, reducing the influence of herding in investment decision-making. This study also helps the policymakers increase the understanding of investors and factors that influence their decision-making, thus ensuring stability in the stock market.

This study shows that the awareness factors can have an extended effect on investor sentiment, hence, affecting their financial performance. Hence, media could influence investor sentiment which may lead to investors' emotional fluctuations and affect their decision making. Increasing the usage of the media and internet by investors play an important role in shaping their mindset, investor sentiment and their decision making. This study helps investment advisors to understand the attitude of the clients and to use effective means of communication while trying to increase awareness among their clients. Herding behavior has an impact on investor sentiment and their decision making. Lack of reliable information portrays the need that individual investors should choose good investment information sources for their investment decisions. Ultimately, this study offers different

perceptions of investors, as they can understand the trading behavior and compare it with their investment characteristics.

Another implication of the results is that investors must know, not only about essential factors that drive Indian equity returns, but also non-traditional elements such as investor perceptions. It mainly monitors from the result that sentiment innovations are relatively correlated with unexpected stock returns. The results of this GARCH model show that the relationship between investor sentiment and stock returns differs significantly over time. Finally, the effect that the present Indian investors feel might have on the anticipated returns of their portfolios should be considered by individual investors. By taking the investor sentiment into account as a significant determinant of stock market volatility in asset price models, investors can enhance their portfolio performance. The results can also work to stabilize investor sentiments and reduce stock market volatility.

### 7.6.Limitations of the research

The major limitations of the study are

a) The data was collected from major metropolitan cities of India and hence the sample may not represent the whole of India.
b) Institutional investors are not considered for the study.

### 7.7.Directions for future research

- This study was undertaken on Indian individual investors and the results of this study can also be tested as a theoretical model in other emerging markets or developed markets.
- Emerging economies have also been noted to have greater growth potential after globalization, and investors (individual and institutional) are more likely to spend on the stock market. Also, the focus should be on other markets as the derivatives market along with the stock market.

- This work mainly concentrates on the Indian equity market. Further, it can also concentrate on other classes of assets like bonds and multi assets.
- The current study focuses only on individual investors, further, it can study on a combination of various types of investors can be used to investigate on their behavior and the effects of behavioral bias on a financial decision, like an individual, institution (pension funds, mutual funds, investment consultants, hedge funds etc.).

### 7.8.Final Word….

The evolving economic landscape combined with socio-economic change has enhanced the responsibility of people towards their economic well-being. The number of financial products and services and their complexity have been explosive in the latest past. Also, there are uncertain returns of such products and services.

The results are particularly significant within the present economic environment, which has destroyed trust in the state, financial institutions and financial regulators of individual investors. Individuals are more likely to be defrauded when investing in the stock market. Individual protection for financial services is limited and access to proper services takes time and cost. Policy-makers do not seem worried about the implication for the state and financial market of such people's distrust. With the constantly evolving financial market, adequate infrastructure needs to be in place to promote financial service and a regulatory framework to make sure that individual investors are covered. Overall, people have no understanding and are not willing to create ideal investments. Also, female have not traditionally been engaged in investment decision-making. Intermediaries and the government should know, educate and engage individual investors, about investment decision making and develop better financial service facilities (Waseem et al. 2015).

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# APPENDIX

## Questionnaire

**Factors influencing investor's sentiment and decision making**

I am Haritha P H, Research scholar at National Institute of Technology, Karnataka. I am doing my doctoral thesis on investors' sentiment and their decision making. As a part of the research, I am conducting a survey to understand the impact of investors' sentiment and their decision making.

I kindly request you to answer all statements. All the information will be confidential and will be used for academic purpose only. Your opinion would be very valuable for the research. Thank you for your participation in this survey.

**Personal Details**

1. Age: Less than 25 years □ 26 - 35 years □
   36 - 45 years □ 46 - 55 years □
   55 years and above □
2. Gender: Male □ Female □
3. Marital Status: Married □ Unmarried □
4. Educational Level: Up to 10th □ 12th Standard □ Graduate □
   Post-graduation □ Others □
5. Occupation: Government sector □ Business sector □
   Private sector □ Retired □ others □
6. Annual Income in Rupees:
   Less than 4 lakhs □ 10 lakhs to 14 lakhs □
   5 lakhs to 9 lakhs □ 15 lakhs to 19 lakhs □
   20 and above □
7. For how long have you been investing?
   Less than 2 year □ More than 2 years □
8. Have you invested in equities as an investment option?
   Yes □ No□

| SI No | Statement | Strongly Disagree 1 | Disagree 2 | Neutral 3 | Agree 4 | Strongly Agree 5 |
|---|---|---|---|---|---|---|
| 9 | Other investors' trading decisions of the stock volume have an impact on your investment decisions | | | | | |
| 10 | I invest in stocks where everyone else is investing | | | | | |
| 11 | I can make easy money by following the perception of other share investors | | | | | |
| 12 | I consider stories of successful investors while investing in share market | | | | | |
| 13 | I give importance to the opinion of peers while investing. | | | | | |
| 14 | You usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market | | | | | |
| 15 | You consider carefully the price changes of stocks that you intend to invest in | | | | | |
| 16 | You have the overreaction to price changes of stocks. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 17 | Market information is important for your stock investment. | | | | | |
| 18 | You put the past trends of stocks under your consideration for your investment. | | | | | |
| 19 | You analyze the companies' customer preference before you invest in their stocks. | | | | | |
| 20 | You study the market fundamentals of underlying stocks before making investment decisions | | | | | |
| 21 | I really expect positive events happening to me | | | | | |
| 22 | I am confident of my ability to choose better stocks than others | | | | | |
| 23 | I'm always optimistic about my future | | | | | |
| 24 | I tend to hold on to securities losing value waiting for better times | | | | | |
| 25 | My past investment successes are attributed to my own skills and understanding | | | | | |
| 26 | Presently I will stay invested in the stock market | | | | | |
| 27 | I plan to increase my investment in the stock | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | market for the coming months | | | | | |
| 28 | My past investment successes make me invest more in stocks | | | | | |
| 29 | I buy shares based on the company's past performance | | | | | |
| 30 | I plan to invest in a stock based on my expectation of market condition | | | | | |
| 31 | I take my investment decision based on current market performance | | | | | |
| 32 | Discuss freely with other traders | | | | | |
| 33 | I am influenced by other traders | | | | | |
| 34 | I initiate trading discussions whenever I get an opportunity | | | | | |
| 35 | I avoid discussions about trading at the workplace | | | | | |
| 36 | I am good at networking with other traders | | | | | |
| 37 | Firmly believe media (newspaper/T.V/magazines etc) enriches my trading knowledge. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 38 | I depend on media for gathering information on trading. | | | | | |
| 39 | I don't rely on media for making trading decisions | | | | | |
| 40 | Financial Information on media is not fully correct | | | | | |
| 41 | I purchase stocks which are on the news | | | | | |
| 42 | The Internet has given me a new trading community to discuss. | | | | | |
| 43 | I use internet for chats and discussions on trading. | | | | | |
| 44 | I am comfortable with discussions/chat about trading on internet | | | | | |
| 45 | My traders' network has expanded beyond country borders with internet | | | | | |
| 46 | I am a member of many investments and trading related websites | | | | | |
| 47 | I feel my friends/family have more knowledge about investing in shares than I do | | | | | |
| 48 | I feel people should take professional's advice while making equity Investment | | | | | |

| SI No | Statement | Strongly Disagree 1 | Disagree 2 | Neutral 3 | Agree 4 | Strongly Agree 5 |
|---|---|---|---|---|---|---|
| 49 | I consider opinions of the firm's majority stockholders | | | | | |
| 50 | I take individual stockbroker recommendations while investing | | | | | |
| 51 | I take into consideration my colleagues recommendation who frequently invest in equities | | | | | |
| 52 | I never make any investment decisions without consulting my investment advisor | | | | | |
| 53 | I feel as if I am under tremendous time pressure when making an investment decision | | | | | |
| 54 | I feel difficulty in making investment decision | | | | | |
| 55 | I delay making an investment decision until it is too late | | | | | |
| 56 | I prefer to leave the decision to others | | | | | |
| 57 | I want to hear information about my preferred investment options | | | | | |

# LIST OF PUBLICATIONS

## JOURNALS

P.H, Haritha &Uchil (2020) Influence of investor sentiment and its antecedent on investment decision-making using the partial least square technique. ***Management Research Review*** (Emerald Scopus: ABDC-C Category-Accepted).

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P.H, Haritha &Uchil (2016) Conceptual framework on market sentiment and the effect of behavioral pitfalls on investment decision making- IOSR ***Journal of economic and finance***. PP 29-34, ISSN: 2321-5925 (Published)

P.H, Haritha &Uchil(2020) An Empirical Examination of Investor Sentiment and Stock Market Volatility: Evidence from Indian Stock Market-***Financial Innovation***(Springer-(Scopus-Under review)

P.H, Haritha &Uchil (2019) Role of Awareness Factors and the Demographic Profile of an Individual in Decision Making- ***International Journal of management pra*****ctice** (Scopus-Under review)

P.H, Haritha &Uchil (2019) Evidence of Awareness Factors and Herding Behavior On Investors Sentiment- ***International journal of economic and business research*** (Scopus-Under review)

P.H, Haritha &Uchil (2019) Effect of Investors Sentiment in Stock Market-Application of Structural Equation Modelling-***Afro Asian journal of finance and accounting*** (Scopus-Under review)

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- P.H, Haritha &Uchil. (2016), "Conceptual Framework on the Impact of Awareness Factors Affecting Investors Sentiments – A Behavioral Finance Approach" Proceeding of International Conference on ***Financial Markets and Corporate Finance*** at IIT Madras, Chennai, India.
- P.H, Haritha &Uchil. (2016), "Conceptual framework on market sentiment and the effect of behavioral pitfalls on investment decision making" Proceeding of 5th ***SIFICO - International Finance Conference*** at K.J. Sommaya Institute of Management Studies & Research, Mumbai, India**.**
- P.H, Haritha &Uchil. (2017), "Impact of herd behavior and awareness factors on investors sentiments- Evidence of Indian Equity Market" Proceeding of International **Conference on Innovative Research in Science, Technology and Management** at NUS Singapore.
- P.H, Haritha &Uchil. (2017), "Determining investor behavioral factors and its impact on investors sentiment and decision-making process: A case of individual investors from India" Proceeding of at **International conference on Applied economic and business** Organized by Academic Research Foundation, New Delhi, India.
- P.H, Haritha &Uchil. (2018), "Effects of investors sentiment in stock market-A behavioral perspective" Proceeding of 51st **International Conference on Latest Researches in Engineering, Science, and Managemen**t Delhi, India

- P.H, Haritha &Uchil. (2019), "An Empirical Analysis of Social and Market Dynamics Influencing Investment Decision Making of equity investors in India" Proceeding of 2nd **International conference on Frontiers of operations research and business studies** held during 27-28 December 2019 at Calcutta Business School and Operation Research Society of India.

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