

UNVEILING THE BEHAVIOURAL BIASES OF RETAIL INVESTORS IN DERIVATIVE MARKET

S.S. MAGESWARI AND P. SASIREKHA

ABSTRACT. The derivative market is growing faster than capital markets in recent years. Investors' focus is moved towards the futures market rather than on the stock market. The involvement of individual investors has increased in the derivative market. In investing, biases lead investors to make irrational and emotional decisions. The study tracks how investors' behavioural biases influence their investment decisions and also analyses the moderating effect of "financial literacy" and "self-efficacy" in the derivatives market. The snowball sampling technique was used to collect the primary data from 125 investors from Coimbatore city. Factor Analysis, Multiple Regression, and Structural equation Model were used for analysis. The results revealed that Behavioural biases such as "Herding Behaviour", "Overconfidence" and "Mental Accounting" positively affect investing in the derivative market and the moderating variables "Financial Literacy", and "Self-Efficacy" directly influence the behaviour of the investors which in turn affects derivative trading.

1. INTRODUCTION

Derivative market is a new segment that offers a mix of portfolios for the wallets of retail investors (Upputuri et al 2020). Financial institutions, Non-Financial Institutions and retail investors play a vital role in the derivative market. Nearly more than sixty per cent of retail investors are in the equity derivative market as per the National Stock Exchange (NSE) (Sarithkumar and Dhandhayuthapani 2016). Technological advancement and the new economic policy of 1991 have amplified the growth of derivative market trading and changed the attitude of investors from savings to investment (Rishi 2015). A derivative instrument is a contract based on the value of an underlying asset and the contract is settled in cash at the time of delivery (Himanshu and Nilesh 2013). The increase in the value of derivatives is quicker than their underlying property and its miles are vital to the Indian Market (Shekhawat 2019). Derivative instruments give a chance to retail investors who are willing to take risks, those who are risk averse can transfer that risk to those investors who have a positive attitude towards taking the risk and making a yield from the trade in the derivative market (Sarithkumar and Dhandhayuthapani 2016). The derivative market has seen a rise in investing over the past few years which become an essential investment. More retail investors are entering the market despite institutional investors (Pallavi 2014).

Date: October 07, 2023. Accepted by the editors March 1, 2024.

Keywords: : Derivative market, Behavioural Bias, Herding Behaviour, Mental Accounting, Overconfidence, Retail Investors.

JEL Code: G11, G40, G41, G53.

S.S Mageswari, Ph. D (Full – Time) Research Scholar, Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu, India. E-mail: magiisunmuk21@gmail.com.

P. Sasirekha, Assistant Professor (SS), Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu, India. E-mail: sasirekha_comm@avinuty.ac.in (Corresponding Author)

Behavioural factors influence retail investors to determine the proportion of investment while choosing the investment avenues. The “demand and supply” lead to price discovery; apart from the economic factor, the psychological factors have a positive and negative impact on their investment decisions. The various recent theories on behavioural finance suggest that numerous cognitive and psychological errors can also impact the investment decisions of retail investors (Bhojte 2018). Behavioural finance is based on the irrationality of the investors. The investors’ emotions are measured under behavioural finance based on different approaches, underlying theories, behavioural factors and variables (Venkatapathy and Sultana 2016).

Financial literacy significantly affects investors’ behaviour toward taking risks (Gerth et al 2021). Comprehensive financial education and clarity regarding the characteristics of the investment instruments are needed for the investors in the prompt selection of derivative instruments for trading (Rishi 2015, Pant and Srivastava 2021). Investors must have a habit of making decisions by self-estimating rather than considering the opinions of others (Gupta 2016, Ahmed et al 2022). In any market, the intention to invest is surrounded by various behavioural factors, financial literacy and psychological factors. Even though the investors are financially literate, the behavioural factor dominates the decision-making process.

1.1. Behavioural Biases and Intention to Invest in Derivative Market. “A bias is a tendency towards making judgmental errors” (Kumar et al 2021). Preconceived ideas or prejudices are behavioural biases. When it comes to investing, biases make investors make irrational and emotional decisions (Ricciardi and Baker 2017). It shows that the investors are influenced by emotions and biases (Shukla et al 2022). This resulted in errors that caused losses and the inability to make a profit, which can be avoided through careful investigation before investing (Verma et al 2016). Investors should be aware of a variety of behavioural biases to avoid falling victim to the emotional trap (Khan et al 2021). Rather than emotional biases, cognitive biases can be managed through investor education and increased financial literacy (Pompian 2021), but a common man is easily influenced by emotional biases. Generally, while trading the investor gets overestimation (overconfidence) in his abilities which will lead them to failure (Amir 2016). Financial markets frequently emphasize herding tendency to demonstrate how investors can stray from their goals due to the behaviour of others, because the stock market is regarded as a leading indicator of an economy, its stability is crucial. Herding bias arises when there is uncertainty and anxiety, or when the possibility of making one’s, own judgement could result in significant losses. As a result, typical investors tend to follow others while making investment decisions to obtain more trustworthy market information. A key factor in influencing people’s decisions to trade on the financial markets is mental accounting. Investors’ decisions are influenced by psychological factors, and sometimes they separate their trades into separate mental accounts because they perceive them as isolated islands. This approach dictates one of the most common mistakes made in the financial market and has a negative impact on the effectiveness of asset allocation. The three biases are highly related towards the financial market and the majority of investors are extremely influenced by these three biases so the most influencing biases such as herding behaviour, overconfidence and mental accounting were identified as the most prominent by reviewing past literature. The study considered Mental accounting under cognitive bias and Herding Behaviour and Overconfidence under emotional biases.

1.1.1. Herding Behaviour. Investors often tend to follow other investors’ decisions, irrespective of their risk-bearing ability. Gupta and Shrivastava 2022 state that investors tend to follow or join groups and blindly believe others’ advice to stay safe. They generally follow the advice of others and believe in the advice of friends (Kumar et al 2021). Any solo investor in the market lacking the right direction can create the tendency to guard. This eventually affects the investment executive process. On the stock markets, it can be observed again and again that investors initiated to sell their shares out of uncertainty and fear of loss (Shukla 2020). They see that other investors have additional statistics and follow market participants as they sell

their shares. This is done out of fear of loss and greed. In herding, investors take the opinions of others to keep their reputation intact and fully follow equity analysts' suggestions. They follow the views of others while picking stocks (Ahmed et al 2022). Derivative investment also takes place on the bias of herd behaviour, because the shares and derivative products are operating together.

Ha1: Herding behaviour positively influences the intention to invest in Derivative Market

1.1.2. *Overconfidence.* The bias is characterized by an individual's tendency to overestimate or have overconfidence in their skills or judgement. This gives the impression that you are much more skilled than others while your abilities may be quite different (Kumar et al 2021). He now falls behind in conducting accurate fundamental and technical research on the stock. They could exude excessive confidence in their knowledge's accuracy and capacity to act on it (Madaan and Singh 2019, Yiwen 2022). Overconfident investors are more likely to create irregular returns by outperforming the market through the expectation of market fluctuation (Dass 2019). Overconfidence can effectively cause investors to believe uncritically that they understand the market and its variations (Kim et al 2007). It is a sort of self-deceit because overconfident individuals overestimate their intelligence and talents, undervalue risk, overstate their control over situations, and frequently show excessive confidence because they think they are better than the typical person. In behavioural finance, overconfidence is a psychological characteristic that significantly influences each investor's choice of investments (Shukla 2020). Overconfidence is a psychological bias that leads investors to overestimate the importance of a parameter and to believe that their judgments are flawed and unreliable (Adel and Mariem 2013, Amman 2016).

Ha2: Overconfidence positively influences the intention to invest in Derivative Market

1.1.3. *Mental Accounting.* Mental accounting is a bunch of cognitive cycles individuals and families utilise to sort out, assess, and track monetary activities (Dass 2019). When it comes to financial and investment decisions, most investors make errors because of this psychological phenomenon. Their response to unplanned losses and gains is similarly impacted by this phenomenon, and the source of money has an impact on how it is spent (Shukla 2020). In daily life, mental or psychological responsibility might have detrimental effects (Gill and Bajwa 2018). Investors may make unreasonable distinctions between returns from income and those from capital appreciation due to mental accounting bias (Santi et al 2019). Investors use a collection of cognitive processes to plan, assess, and monitor their investment activities.

Ha3: Mental accounting positively influences the intention to invest in Derivative Market

1.2. **Financial Literacy and Intention to Invest in Derivative Market.** Financial literacy is the ability to understand how money functions in a business or an individual's life (Gerth et al 2021). A person's awareness of numerous options, abilities, and investment decisions can be revealed by the level of financial literacy (Zhang et al 2021). The goal of financial literacy is to understand how money functions. It means that one should consider how they earn, spend, manage, and invest their money. Financial literacy is frequently crucial since wise financial decisions are essential to success (Yang et al 2021). Numerous activities are included in financial literacy programmes to improve investors' knowledge, self-assurance, and financial management skills. Financial Literacy provides answers provides questions such as how much to save or invest, where to invest, how long to invest for, how much will be returned, how to profit from tax planning, and how to prepare for retirement in the decision-making process (Bellofatto et al 2018). Financial planning is simply the collection of skills and knowledge that one has and uses to guide financial decisions (Gupta and Shrivastava 2022).

Ha4: Financial Literacy moderates the relationship between behavioural biases and Intention to invest in Derivative Market

1.3. Self-efficacy and Intention to Invest in Derivative Market. An important psychological construct known as self-efficacy (SE) is significantly associated with both personal financial behaviour and decision-making style, it varies from person to person. Individuals with extra protruding self-efficacy over definite behaviour will usually participate, design high aims, exhibit an effective assessment of the given task and have less pessimistic psychological effects (nervousness, stress, misery) related to adversity (Brooks and Williams 2021). When examining the relationship between personality qualities and investment intention, “financial self-efficacy has demonstrated both mediating and moderating roles”. Investors with higher self-efficacy generally sense longer-term regulation on their financial situation than investors with lower self-efficacy, when the market is volatile. “Literature has shown that self-efficacy positively affects financial practices” (Nadeem et al 2020).

Ha5: Self-efficacy moderates the relationship between behavioural biases and Intention to invest in the Derivative Market.

2. LITERATURE REVIEW

In addition, a wide literature review has been carried out to find the research gap. Financial market anomalies lead to the rise of behavioural finance (Yiwen 2022). The decision-making process of investors comprises many psychological changes, which are reflected in behaviour (Venkatapathy and Sultana 2016). The investor’s behaviour was elaborated by psychologists by stressing the characteristics which shape their investment decisions (Rahman et al 2015). Emotive and cognitive aspects may interfere with making illogical investment decisions (Osamor et al 2019). Feelings and emotions hold an important place in the investment decisions of equity investors. It is said that individuals do not perform logically every time and it is difficult to expect investors to enlarge their utility which is impossible in reality (Shukla et al 2022). Both young and experienced investors are also affected by biases (Venkatapathy and Sultana 2016). Experienced and seasoned investors have gained success by overcoming biases and also avoiding making the same mistakes (Ricciardi and Baker 2017). The demographic variable of education has a significant effect towards investors’ decisions (Amman 2016). Younger, male, low-income, and low-literate investors show more overconfident behaviour. Investors are more overconfident in less developed countries than in more developed countries (Sujesh 2021). Overconfidence is dangerous to wealth which decreases the return with an increase in turnover (Tekçe and Yılmaz, 2019). There is a significant effect of loss aversion, overconfidence, and risk perception towards stock market investment decisions whereas herd has an insignificant effect. Overconfidence dominates the rationality of the investors and has a long-standing effect and also brings in the point that retail investors are extra overconfident than institutional investors (Yiwen 2022). Irrational decision-making affects the middle-class or low-income groups, so necessary care should be taken while deciding (Kumar et al 2021). Higher financial literacy was found in investors with higher education and who have richer investment decisions (Bellofatto et al 2018). Financial self-efficacy has a changeless annotative power for risk attitude (Chris 2021). Most investors prefer blue-chip stocks, which reduces the investor’s perception towards the risk. It gives investors only some chance of loss since these stocks usually earn a profit so many investors go to invest in them (Ahmed et al 2022). After reviewing the literature, it was found that the combination of behavioural biases and the moderating effect of financial literacy and self-efficacy highly influences the intention to invest in a derivative market.

3. REASERCH PROBLEM

Nowadays investors prefer to invest in the derivative market instead of investing in specific assets like shares, because of the increasing awareness about the market (Koesrindartoto et al 2020). Several factors have a significant impact on investors when they trade in the financial

market. Despite considering the company's fundamental analysis, the investors are still influenced by a few emotional factors, such as behavioural biases and how familiar they are with that stock. In addition, few investors are knowledgeable about how to manage their financial activities and investment decisions. Understanding the traits that influence investors to trade in the derivative market is important. Irrational thoughts or actions known as behavioural biases might unintentionally affect how they make decisions. An essential factor that influences the aim or incentive that the investor creates is behavioural bias. Even though behavioural bias is an important consideration when making an investment decision, investors can only succeed in their goal if they avoid it. The study attempts to answer questions like How investors' behavioural biases affect their investment decisions? and how financial literacy and self-efficacy affect trading in the derivatives market?

4. OBJECTIVE OF THE STUDY

- To identify the impact of behavioural biases on the intention to invest in the derivative market
- To know whether financial literacy and self-efficacy moderate behavioural biases and intention to invest in the derivative market

5. THEORETICAL BACKGROUND AND CONCEPTUAL FRAMEWORK

A conceptual framework (Figure 1) was constructed and analysed; the variables were identified and based on the impact of the variable and the root cause; a conceptual framework was derived. The conceptual theory perceives the relationship between the variables that are taken for the study. The schematic representation (Figure 1) of the model explains the association between the variables through which the reader gets to know about the theory being explained (Dittrich et al 2005). Hayat and Anwar 2016 have proposed a model referring to financial literacy affecting the investment decisions of investors. High literates have financial knowledge whereas low-literate investors get the knowledge from their inner circle. This is the main cause for the arising of behavioural biases. The human mind is an unbelievable thing, yet it holds its restraints (Shukla et al 2022). Kumar et al 2021 commented that overconfident investor estimates their financial knowledge while underestimating the risk involved; they rank themselves greater than other investors (Dass 2019). Herding investors imitate the behaviour of other investors and the investors are not rational towards their investment decisions (Madaan and Singh 2019). The mental accounting bias leads the investor to act irrationally to change the way money is placed and also triggers them to utilize more money (Santi et al 2019). The study adopted the Prospect Theory which was developed by the psychologists Daniel Kahneman and Amos Tversky (Afriyanti 2009). The theory defines that the decision-making of investors relies upon certain biases when choosing among several options. A proposed model is framed by reviewing various kinds of literature, the study has taken herding behaviour, overconfidence, and mental accounting as controlling variables that directly influence the intention to trade in derivatives. Financial literacy and Self-efficacy are considered moderating variables which influence the attitude of investors while trading in derivatives. To identify and classify the statements into variables, factor analysis was applied using SPSS software. The influence of the independent factors (Herding Behaviour, Overconfidence, Mental Accounting,) and the effect of moderating variables (Financial Literacy, Self-Efficacy) on the dependent factors (Intention to Invest in the Derivative Market) were built by constructing a Structural Equational Model and tested with the help of the SPSS AMOS 20 application.

6. DATA DESCRIPTION

Data collection is the systematic process of gathering and measuring information on variables of interest in a systematic, organised, and objective manner. It is a fundamental step in the research process and is crucial for obtaining empirical evidence to answer research questions,

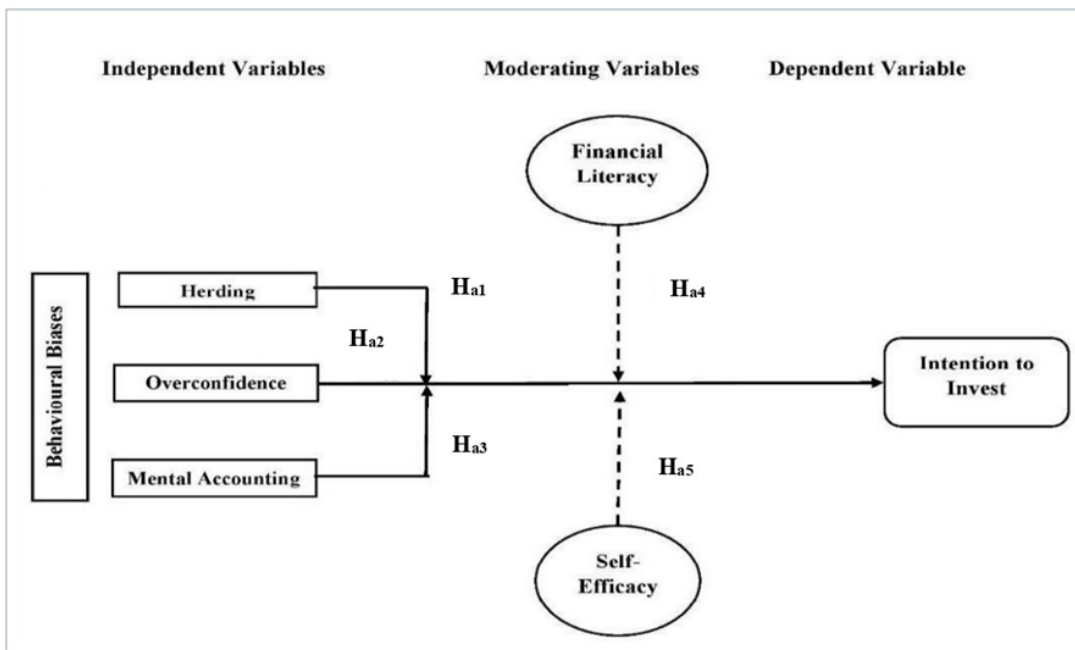


FIGURE 1. Determinants of Intention to Invest by Investors in Derivative Market – A Conceptual Model

test hypotheses, or achieve the objectives of a study. The accuracy and reliability of collected data significantly impact the validity of research findings. Primary data is gathered to address the research questions, test hypotheses, or fulfil the objectives of the study. The data can be collected through various methods, and the choice of method depends on the nature of the research and the information needed. A well-structured questionnaire was constructed to collect the data from the investors.

6.1. Sampling unit. A sample unit refers to the individuals that are included in the research. In this study, the retail investors in the Derivative Market are the sampling units. For the survey respondents must be the person who invests in the Derivative Market.

6.2. Sampling Technique. This study used the Snowball sampling technique. Snowball sampling is a non-probability sampling technique used in research to identify the participants through referrals from existing study subjects. This method is particularly useful in situations where the population of interest is difficult to locate or access directly. Snowball sampling is adopted for the study because the retail investors in Derivative Market are scattered and it is difficult to locate the investors from Coimbatore city. Since it is difficult to identify the retail investors of the Derivative Market, the researcher approached the investors through Stock Broking Companies. The Stock Broking Companies took the initiative to reach the investors and collected the necessary data from them. The questionnaires were filled out with the help of the broking houses in the respective city since personal meetings with the investors were not possible. Investors with accounts managed by stockbroking companies become a target population for the study. This collaborative approach can be beneficial as it allows the researcher to tap into the expertise and access of stockbroking companies, streamlining the data collection process.

6.3. Sample size. The sample size is the number of participants or observations included in the study. The choice of sample size depends on various factors, and it has implications for the study's reliability, validity, and generalizability. A total of 130 questionnaires were distributed

in Coimbatore city out of which 125 generated valid responses. The sample was drawn at per convenience of the brokering firms. The visitors and investors who approached the brokerage house were concentrated.

6.4. Questionnaire design. A questionnaire scale refers to the set of responses or options provided to participants in the study. The scale helps to measure and quantify participants' attitudes, opinions, behaviour, or characteristics. The questionnaire contained fifteen questions. The questionnaire was based on the five-point Likert scale. The questions were arranged in the following sequence to get a proper understanding of investors' behaviour and responses. The questions were related to variables such as financial literacy, attitude, personality traits, behavioural biases and self-efficacy through which their behaviour can be estimated. The questionnaire was framed in a manner that is clear, accurate and simple so that it was easily understood by the investors.

6.5. Reliability Test. All statistical analysis was done using SPSS and AMOS software. The reliability test was carried out, to find whether the variables are reliable to carry out the study. Thus, the test was carried out for the factors and the values are shown in Table 1.

TABLE 1. Reliability and Scale Statistics

S. No	Variable	Item	Cronbach Value
1.	Financial Literacy	5	0.709
2.	Self-Efficacy	5	0.821
3.	Herding Behaviour	5	0.847
4.	Overconfidence	5	0.893
5.	Mental Accounting	4	0.991

Cronbach's Alpha value of Financial Literacy is 0.709 which is more than the suggested value of 0.7 (Peterson 1994). Self-Efficacy Cronbach's Alpha value is 0.821 which is above 0.7. The value of herding behaviour is 0.847 which is reliable. The values for Overconfidence and Mental Accounting are 0.893 and 0.991 which fall above the suggested value 0.7. Hence, the reliability of the question is proved (Peterson 1994) (i.e.) the questionnaire is reliable for data collection.

6.6. Normality Test. The Kolmogorov-Smirnov test is used to determine if a collection of data originates from a normal distribution, which is the null hypothesis (Kolmogorov 1983). The test statistics generated by the Kolmogorov-Smirnov test are used to check for normality. The KS test was done for 125 samples and it was found that the distribution was normal. Thus, the parametric test was used for analysing the data. It is clear that the value of the Kolmogorov-Smirnov statistics p-value is more than 0.05 (at a 5% level of significance). Thus, it indicates that there is a normal distribution.

The run test is done to determine whether random selection has been made in the process of sample selection from an ordered population. The value for the majority of the statements is greater than the significant value of 0.05. Thus, it indicates that the data is random.

6.7. Tools and Techniques. The behavioural biases of retail investors were identified by using confirmatory factor analysis to reduce the multitude of variables to a lesser number of factors (Rummel 1967). The formula for factor analysis is

$$X = \mu + LF + e$$

where X is a vector of measurement; μ vector of means; LF is loading factors and e is residuals.

Multiple regression analysis was used to analyse the relationship between behavioural biases and the behaviour of retail investors in the derivative market. According to Kang and Zhao

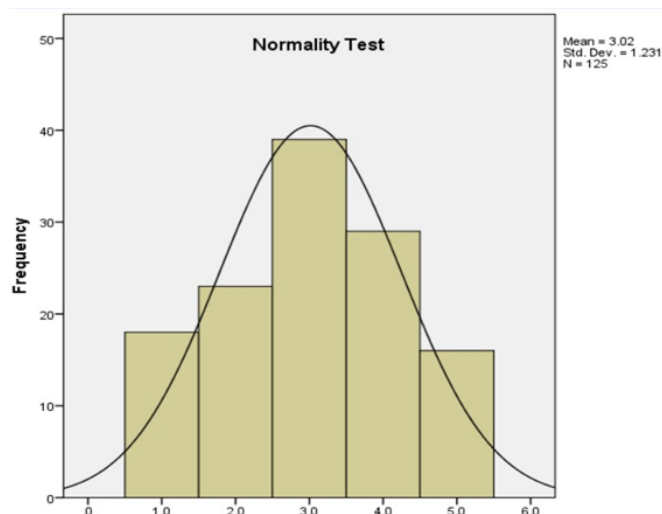


FIGURE 2. Normality Test

2020, multiple regression is calculated using the formula $Y = a + b_1 X_1 + b_2 X_2$. Where Y is the dependent variable; a is constant; and X1 and X2 are the independent variables.

The link between behavioural biases and the behaviour of retail investors in the derivative market has been a subject of interest and has explored general associations between certain biases and retail investors' behaviour. SPSS AMOS was used to analyze complex relationships among variables, test hypotheses, and assess the fit of their models to the observed data between behavioural biases as an independent factor, financial literacy and self-efficacy as a moderating variable and intention to invest as the dependent variable.

6.8. Variables.

6.8.1. *Independent variable and Dependent variable.* Based on the Prospect Theory, behavioural biases were taken as an independent variable to measure the behaviour of retail investors. Biases are considered the independent variable to measure investment behaviour, exploring how variations in biases influence or predict different aspects of the behaviour of retail investors (Rathore and Anshu 2023). The most prevalent biases were determined to be herding behaviour, overconfidence, and mental accounting. One cognitive bias (mental accounting) and two emotional biases (herding behaviour and overconfidence) are both present in the research. Although investor education and greater financial knowledge help mitigate cognitive biases rather than emotional ones (Pompian 2020), emotional biases still have a powerful effect on the average person.

The intention to invest is taken as the dependent variable. Intentions are "assumed to capture motivational factors that influence a behaviour" (Ajzen 1974). An investment intention is the decision to invest in any kind of asset, whether it be short- or long-term. Psychological elements are a major determinant of an investor's behaviour, even while environmental and social factors have little effect (Sarkar et al 2017). Investment intentions are influenced by behavioural characteristics, including mental accounting, overconfidence, and herd behaviour (Phung and Nguyen 2017). The manifestation of herd behaviour, overconfidence, and mental accounting effects varies among investors (Madaan 2016).

6.8.2. *Moderating Variable.* The nature and intensity of the relationship between the dependent variable and its predictor variable can be altered by moderator variables (Coleman 2016). Moderation analysis helps to understand whether the strength or direction of the relationship between two variables (in this case, behavioural biases and investment behaviour) depends on

the level of a third variable (financial literacy and self-efficacy). High levels of financial literacy may enhance individuals' understanding of investment products, risk, and return, making them more confident in their investment decisions. On the other hand, low financial literacy might lead to misunderstandings or misinterpretations of financial information, impacting the decision-making process (Sulistiawan 2019). Self-efficacy refers to an individual's belief in their ability to successfully perform investment-related tasks and make effective financial decisions (Gupta 2019). Financial literacy and self-efficacy may interact synergistically. A combination of high financial literacy and high self-efficacy could result in individuals who are well-informed, confident, and capable of making sound investment decisions. Conversely, low financial literacy and low self-efficacy might contribute to greater uncertainty and hesitation in financial decision-making (Zhu 2017).

7. RESULTS AND DISCUSSION

The present section unveils the key findings of the study and engages in a comprehensive discussion to interpret, contextualize, and derive meaning from these results. Structured in a manner reflecting the research questions and objectives, this section delves into the statistical outcomes, drawing attention to patterns, relationships, and noteworthy observations. Descriptive statistics, as portrayed in Table 2 encapsulate the fundamental characteristics of the sample (Percentage analysis). The results of the study are analysed using appropriate tools and are discussed below:

TABLE 2. Socio-Economic Profile of the Investors

Particulars	Category	Percentage
Gender	Male	64
	Female	46
Age	Below 25 years	12.8
	25-30 years	16
	30-40 years	38.4
	40-50 years	23.2
	Above 50 years	8.8
Qualification	School level	7.2
	UG	32.8
	PG	36.8
	Professional	23.2
Annual Income	Below Rs. 2,00,000	17.6
	Rs. 2,00,000 – Rs. 5,00,000	41.6
	Above Rs. 6,00,000	40.8

In the study area, male investors are dominating the derivative market and GEN Y are the active participants in derivative trading. It is found that the majority have postgraduate qualifications with an annual income of above INR 2,00,00 and below INR 5,00,000.

Derivative market growth is faster in the Indian market. The retail investor count is increasing day by day (Li et al 2021). Since there are many retail investors involved, there are certain factors that influence them to invest in the derivative market. To extract the factors, confirmatory factor analysis has been carried out to bring in the form to construct a model. The KMO (Kaiser-Meyer-Olkin) tests the relevance of the factors (Kaiser 1974).

The appropriateness of the sample is 0.897 which fits in the KMO measure of the sample adequacy and Bartlett's Test of Sphericity is positive to a level of significance is < 0.001 conveying that there is a greater level of correlation between constructs, which makes it appropriate to use factors analysis (Shrestha 2021).

TABLE 3. Extracted Factors of Intention to Invest

Items	Component				
	1	2	3	4	5
I have full knowledge of the derivative Market	.683	.125	.098	.356	.128
I invest only after checking the company's financial statements for the past 5 years	.666	.199	.300	.080	-.010
Considering most familiar sectors while investing	.665	.129	.094	.307	.160
I know how to monitor the fluctuation in the market	.587	.276	.040	-.052	.197
I am aware of the prices of the stock in a day	.569	.381	.140	.084	.367
I continually stick with my spending plan while sudden prices arise	.209	.751	.216	.040	.155
I attempt to make development in the direction of my economic desires though it's far more challenging	.268	.701	.171	.018	.000
I quickly try to figure out a solution at hard times	.316	.652	.223	.228	-.006
I have faith in my capacity to manage my budget	.042	.615	-.012	.255	.275
I try to overcome if I am running out of money due to losses	.357	.587	.176	.102	.090
My extent of funding additionally relies upon the opinion of the other	.283	.360	.636	.123	.006
I trust that records from friends, relatives, and associates have excessive Reliability	.242	.192	.622	.365	.141
I comply with the marketplace moves at the same time as promoting stocks	.294	.309	.584	-.013	.256
Other's investor's recommendations of investment affect my purchase	.100	.079	.524	.323	.054
The rate of return of my neighbour's investment meets my expectation	.137	.299	.512	.092	.040
I feel assured to assess securities costs in my funding portfolio myself	.202	.133	.166	.712	.031
My previous portfolio investments had been especially because of precise funding skills	.353	.285	.285	.632	-.054
My capacity to expect future costs is better	.261	.398	.141	.607	.314
My funding choices can in general earn higher-than-common returns inside the market	.065	.017	.232	.537	.247
I accept as true that my abilities and information in the marketplace assist me to outperform the marketplace	.154	.243	.179	.530	.239
I always allocate my income to several accounts	.201	.128	.098	.058	.744
I continually deal with my monthly profits and bonuses differently	.117	-.041	.054	.002	.614
I usually calculate the price to be incurred from my monthly money	.253	.179	.450	-.013	.588
I do now no longer usually calculate the price to be incurred from my bonus money	.209	.151	.216	.040	.555

Continued on next page

Table 3 – continued from previous page

Items	Component				
	1	2	3	4	5
Total	12.022	1.729	1.380	1.212	1.174
Percentage of variance	40.072	5.762	4.601	4.040	3.915
Cumulative percentage	40.072	45.835	50.436	54.476	58.390
Extracted Factors	Financial Literacy	Self-Efficacy	Herding Behaviour	Overconfidence	Mental Accounting

The statements are grouped into five main components based on the Eigenvalue. Eigenvalues provide information about the amount of variance explained by each factor. Higher eigenvalues indicate more influential factors. Consider eigenvalues closer to 1 as a criterion for retaining factors. Analyzing the eigenvalues helps in determining the significance of each factor in explaining the observed variance (Harrington 2008). The extracted factors are named based on the similarity of statements that as “Financial Literacy”, “Self-Efficacy”, “Herding Behaviour”, “Overconfidence” and “Mental Accounting”. From the percentage, it is understood that all five factors together hold 58.390 per cent of the characteristics of the data and it is accepted (Porter 2012). The communalities value is also more than 0.5 for all the statements and was considered for future analysis.

7.1. Determinants to Trade in Derivative Market. As per the proposed model, the ‘Intention to Invest’ is taken as the output variable and the covariates are ‘Herding Behaviour’, ‘Overconfidence’, ‘Mental Accounting’ and the moderating variables are ‘Financial Literacy’ and ‘Self-Efficacy’.

TABLE 4. Determinants of Intention to Invest in Derivative Market

Coefficients							
Var Code	Factors	Unstd Coeffs		Std Coeffs	t Value	P Value	Significance
		B	Std. Error	Beta			
	Constant	6.420	0.068		4.442	.003	
X1	Herding Behaviour	0.520	0.048	0.061	0.892	.000	Significant
X2	Overconfidence	0.408	0.052	0.051	1.523	.012	Significant
X3	Mental Accounting	0.224	0.013	0.080	3.085	.020	Significant
X4	Financial Literacy	0.399	0.075	0.079	3.755	.010	Significant
X5	Self-Efficacy	0.291	0.060	0.097	1.350	.000	Significant

The coefficient of multiple determinations (R²) shows the number of variations explained by all these independent variables to the dependent variable (Keith 2019). The R-squared value of 2.893 indicates the proportion of variance in the dependent variable explained by the

independent variables. A higher R-squared suggests a better fit. In this study, the R-value was 4.911, which shows the highest correlation and the adjusted R-squared value of 1.852 accounts for the number of predictors and adjusts R-squared for model complexity. The F value is 72.458, which is the result of an F-test assessing the overall significance of the regression model. A high F value indicates that the model is statistically significant (Stolzenberg 2004). The P value associated with the F test is 0.000, suggesting that the overall model is statistically significant at conventional significance levels. All the independent variables (X1 to X5) are statistically significant, as indicated by their p-values being less than 0.05. The multiple regression equation for determinants influencing retail investors to trade in Derivative Market (Y1) is

$$Y1 = 6.420E + 0.520x1 + 0.408x2 + 0.224x3 + 0.399x4 + 0.291x5$$

The extracted factors (Table 3) from the analysis are taken to construct the pathway to test the association with investment. The formulated hypotheses are

Ha1 → Herding Behaviour has a positive effect on the Intention to Invest in Derivatives

Ha2 → Overconfidence has a positive effect on the Intention to Invest in Derivatives

Ha3 → Mental Accounting has a positive effect on the Intention to Invest in Derivatives

Ha4 → Financial Literacy has a positive effect on Intention to Invest in Derivatives

Ha5 → Self - Efficacy has a positive effect on the Intention to Invest in Derivatives

Table 5 appears to present the results of a path analysis, specifically examining the relationships (path coefficients) between various independent variables (X1 to X5) and the dependent variable "Intention to Invest in Derivatives." The analysis includes the coefficients (B), standard errors (S.E.), critical ratios (C.R.), p-values (P), and results (Sig) for each path. Additionally, collinearity diagnostics such as tolerance and variance inflation factor (VIF) are provided.

TABLE 5. Path Analysis of the Factors

Relationship		B	S.E.	C.R.	P	Result	Collinearity	
							Tolerance	VIF
$H_{a1} \leftarrow X_1$	Herding Behaviour	0.463	0.070	0.506	0.000	Sig	0.521	1.258
$H_{a2} \leftarrow X_2$	Overconfidence	0.375	0.063	0.480	0.000	Sig	0.354	1.964
$H_{a3} \leftarrow X_3$	Mental Accounting	0.365	0.096	0.364	0.000	Sig	0.913	2.541
$H_{a4} \leftarrow X_4$	Financial Literacy	0.485	0.075	0.411	0.000	Sig	0.655	2.110
$H_{a5} \leftarrow X_5$	Self-Efficacy	0.335	0.111	0.398	0.000	Sig	0.761	1.899

Note: Intention to invest in Derivatives; S.E. = Standard Error; C.R. = Critical Ratio; β = Standardized Beta Coefficients; *p < 0.05; Sig = Significant

Derivative market investment is highly influenced by the behaviour of retail investors. Some biases affect the behaviour of investors. Herding behaviour is highly influenced when compared to other behavioural biases (Table 5). Investors intend to replicate the behaviour of others who do the investment, they don't trust the assessment done by them (Linciano 2011). The herding behaviour (X1) reflects 0.463 units (Table 5) of change in intention to invest. 0.375 units of change will be reflected in the intention to invest when the overconfidence of the investors (X2) changes by one unit (Table 5). Overconfidence of investors leads to hasty decisions for investing in derivatives it can pave the way for earning profit or it can be a wrong decision that results in a loss (Kumar and Nisha 2015). One unit of change in mental accounting reflects 0.365 units (Table 5) of change in intention to invest. Mental accounting can influence investors to make irrational investment decisions. 0.485 units and 0.335 units of changes in financial literacy and self-efficacy reflected in the intention to invest when these factors change by one unit. Investors who can overcome behavioural bias are put into the profit zone (Rathore and Anshu 2023).

The standard errors provide a measure of the precision of the estimated coefficients. Critical ratios (C.R.) are calculated by dividing the path coefficient by its standard error. The p-values indicate the statistical significance of each path coefficient. All paths (Ha1 to Ha5) have p-values of 0.000, indicating that the path coefficients are statistically significant at conventional significance levels (e.g., 0.05). The critical ratios are all greater than 1.96 (assuming a two-tailed

test), further supporting the significance of the relationships. All relationships are labelled as "Sig," indicating statistical significance.

Tolerance measures the proportion of variance in an independent variable that is not explained by other independent variables. A low tolerance suggests potential collinearity. VIF (variance inflation factor) measures the degree to which the variance of an estimated regression coefficient increases if the predictors are correlated. Tolerance values range from 0.354 to 0.913, and VIF values range from 1.258 to 2.541. Generally, tolerance values below 0.1 or VIF values above 10 might indicate potential collinearity issues (Hair et al 2019). In this case, the values appear to be within an acceptable range, suggesting it is also free of the collinearity issue.

The path analysis results indicate statistically significant positive relationships between the specified factors (Herding Behavior, Overconfidence, Mental Accounting, Financial Literacy, and Self-Efficacy) and the intention to invest in Derivatives.

TABLE 6. Model Fit Indices

Fit Indices	Standard	Result	Model Fit
Absolute Fit Measures			
Chi-square χ^2		113.30	
Degree of freedom		46	
P value		0.369	
Root Mean Square Error of Approximation (RMSEA)	≤ 0.08	0.072	Good Fit
Goodness of Fit Index (GFI)	≥ 0.9	0.961	Good Fit
Adjusted Goodness of Fit Index (AGFI)	≥ 0.9	0.911	Good Fit
Incremental Fit Measures			
Normal Fit Index (NFI)	≥ 0.9	0.952	Good Fit
Comparative Fit Index (CFI)	≥ 0.9	1.089	Good Fit
Relative Fit Index (RFI)	≥ 0.9	1.029	Good Fit
Incremental Fit Index (IFI)	≥ 0.9	1.041	Good Fit
Root Mean Square Residual (RMR)	≤ 0.8	0.07	Good Fit
Parsimony Fit Measures			
Parsimony Comparative Fit Index (PCFI)	≥ 0.5	1.121	Good Fit
Parsimony Normed Fit Index (PNFI)	≥ 0.5	1.321	Good Fit

The chi-square test assesses the difference between the observed and expected covariance matrices. A higher p-value (0.369) suggests that the model fits the data well. However, chi-square is sensitive to sample size, and a non-significant result may not always indicate a good fit. RMSEA evaluates the discrepancy between the observed data and the model, considering model complexity. An RMSEA below 0.08 is generally considered indicative of a good fit (Hair et al 2012). In this case, the RMSEA is 0.072, suggesting a good fit. GFI assesses how well the model's predicted covariance matrix matches the actual data covariance matrix. A GFI above 0.9 is indicative of a good fit. Here, the GFI is 0.961, suggesting a good fit. AGFI adjusts the GFI for model complexity. An AGFI above 0.9 is generally considered a good fit. Here, the AGFI is 0.911, indicating a good fit. Incremental Fit Measures: Normal Fit Index (NFI), Comparative Fit Index (CFI) Relative Fit Index (RFI), and Incremental Fit Index (IFI) these indices compare the fit of the proposed model to a null model (independence model). Values above 0.9 for NFI, CFI, RFI, and IFI are considered indicative of a good fit. Here, all these indices exceed 0.9, with CFI slightly above 1 (1.089). RMR assesses the difference between the

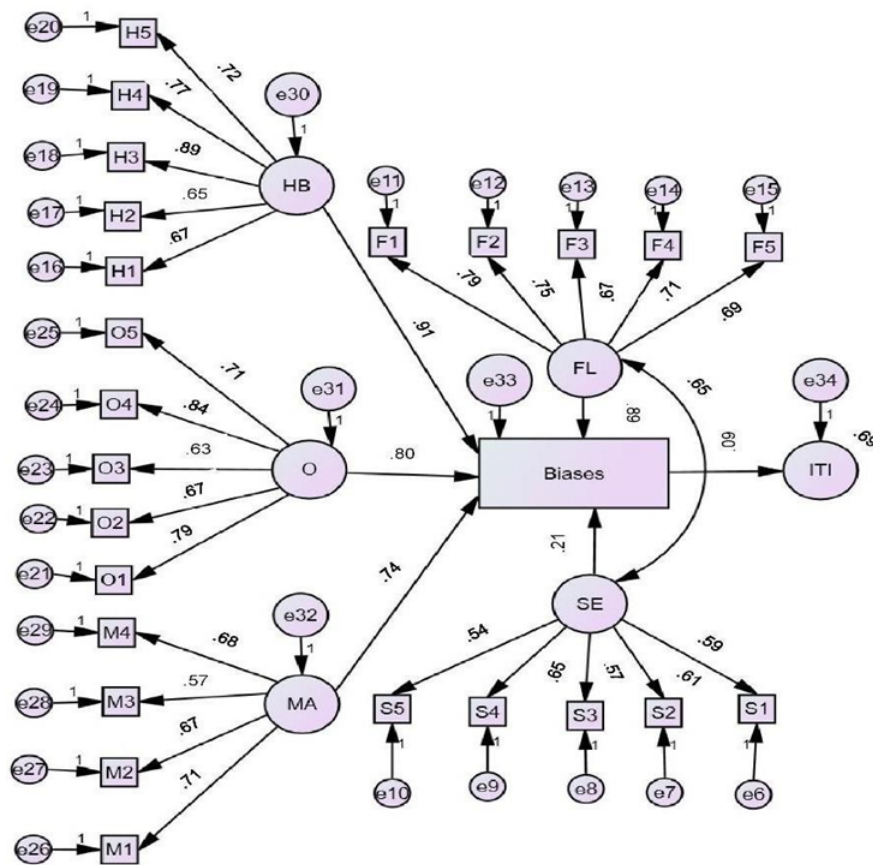


FIGURE 3. Determinants of Intention to Invest by Investors in Derivative Market

Source: Computed Data (AMOS)

observed and predicted covariance matrices. An RMR below 0.8 is often considered indicative of a good fit. Here, the RMR is 0.07, suggesting a good fit. Parsimony Comparative Fit Index (PCFI) and Parsimony Normed Fit Index (PNFI) these indices consider model parsimony by penalizing for additional parameters. Values above 0.5 are typically considered indicative of a good fit. Here, both PCFI and PNFI exceed 0.5.

The overall interpretation suggests that the structural equation model demonstrates a good fit to the data across a variety of fit indices. The p-value for the chi-square test is significant, and all other fit indices meet or exceed commonly accepted thresholds for indicating a good fit. The model appears to capture the underlying relationships among the observed variables well, and the goodness-of-fit measures suggest that the model is an appropriate representation of the data.

The study measures how the investor's behavioural biases "Herding Behaviour," "Overconfidence" and "Mental Accounting" affect the intention to invest in the derivative market and the moderating effect of "Financial Literacy" and "Self-Efficacy". The impact was positive and significant by supporting the model fit indices and hypotheses (Aftab 2020).

Figure 3 brings out the impact of the behavioural biases – Herding behaviour (HB), Overconfidence (O) and Mental accounting (MA) of the retail investors and the "moderating effect of Financial Literacy" (FL) and "Self-efficacy" (SE) on the intention to invest in the derivative market. "Financial Literacy (Ha4) has a high moderating effect on" investors' intention to invest in derivative markets (Kanojia and Malhotra 2023) (ITI) with a value of 0.89 per cent (Figure 3). The operations and performance of the derivative market differ entirely. The price is

based on the underlying stock rather than its direct price of the stock. Hence financial literacy shapes retail investors more, to engage in derivative market trading (Aryal 2021). Investors willing to invest in the derivative market need to be careful (Jetty et al 2021). There are certain biases that an investor must overcome. Herding behaviour (Ha1) has a high impact with a value of 0.91 per cent (Figure 3) towards the intention to invest in the derivative market, as many retail investors are highly influenced by their friends, families, etc. (Fatima and Jitendra 2021). The majority of the investors lack in their unique way and instead tend to follow others (Saleem et al 2023). This ultimately affects the investment decisions of retail investors. With 0.80 per cent (Figure 3), Overconfidence (Ha2) influences investors to overestimate (Sapkota 2023) and believe in their own decisions while investing in the derivative market. Mental accounting (Ha3) (0.74 per cent) impacts less towards investment in derivatives when compared to overconfidence and herding (Sharma et al 2021). Self-efficacy (Ha5) plays an important role in determining the investment of retail investors but has a less moderating effect of 0.21 per cent (Figure 3) when compared to financial literacy (Kumar and Nisha 2016).

8. IMPLICATIONS

This research will help retail investors conscious towards their decision-making in the derivative market. The study has applied the concepts of Prospect Theory (Afriyanti 2009), though it explains in-depth the behavioural biases towards investment decisions. Two main factors such as financial literacy and self-efficacy have been included in this model as moderating factors which influence investment decisions. The study brings out the importance of the three main biases Herding behaviour, Overconfidence and Mental Accounting and also creates awareness among the investors about their behaviour. By providing proper guidance and increasing financial knowledge among investors, the study suggests that herding behaviour can be mitigated. This emphasizes the role of education and information dissemination in reducing irrational investment choices. The research acts as an "eye-opener" for investors by highlighting the bias of overconfidence. Investors can use this knowledge to avoid overestimating their abilities, leading to more informed and rational decision-making. The study suggests that treating money as fungible can help investors avoid mental accounting biases. Encouraging rational decision-making and a holistic view of financial resources can contribute to more effective investment strategies. This study adds a further acquaintance to the connection between behavioural biases and financial choices to the previous research (Gerth et al 2021, Anbukarasi and Devaki 2020). The study serves as a guide for investors on how to avoid common biases like herding behaviour and overconfidence. By providing proper guidance and increasing knowledge, investors can make decisions based on sound principles rather than following the crowd blindly or overestimating their capabilities.

Recognizing the prominence of behavioural biases, financial institutions can implement risk management strategies that account for the potential impact of investor behaviour on market dynamics. This includes designing risk communication strategies that resonate with the psychological aspects of decision-making. NSE and BSE are enhancing their outreach efforts by conducting joint awareness programs for investors through common forums. However, there is a need to strengthen their communication channels to ensure a broader dissemination of information. Regulatory bodies can use the research to inform the development of policies aimed at protecting retail investors. Insights into the behavioural biases affecting decision-making can guide the implementation of regulations that promote transparency, fairness, and investor protection in the derivative market. The study highlights the importance of financial literacy and self-efficacy in moderating behavioural biases. Regulatory bodies can collaborate with educational institutions and financial organizations to promote initiatives that enhance investor knowledge and confidence. By understanding the implications of herding behaviour, overconfidence, and mental accounting, regulatory bodies can work towards maintaining market integrity. This involves monitoring and addressing practices that may lead to irrational decision-making or systemic risks.

9. CONCLUSION

Investment in the financial market has transformed from static finance to behavioural finance (Shukla et al 2022). In the contemporary financial landscape, modern finance is progressively supplanting traditional finance due to its increased recognition of psychological influences on investor behaviour (Madaan and Singh 2019). The heightened participation of investors in the derivative market has led to various changes, including the emergence of market anomalies. Enhanced knowledge of behavioural finance empowers investors to be proactive and cautious, enabling more successful investment decisions (Shukla et al 2022).

The study focuses on three prominent behavioural biases—herding behaviour, overconfidence, and mental accounting—assessing the level of their effects on investment decision-making. It delves into the specific effects of each bias on investment decision-making, asserting their substantial influence on investor behaviour. The moderating roles of financial literacy and self-efficacy are highlighted, suggesting that these factors directly impact behavioural biases. Financial literacy is portrayed as a driving force motivating ordinary investors to participate in the market, while self-efficacy is positioned as a crucial factor gauging an investor’s positive sustainability, particularly after incurring losses. The study identifies herding behaviour (represented as X1) and financial literacy (represented as X4) as exerting a particularly potent effect on the intention to invest in the derivatives market when compared to other factors extracted (as detailed in Table 5 and Figure 3) (Rasool and Safi 2020). This insight underscores the specific significance of these factors in shaping investor decisions within the derivative market context.

As a result, the study aims to benefit investors in knowing the general mistakes made by them while making investment decisions. Finally, it may be stated that numerous research has been done on cognitive biases and how they affect investment choices are the need of the moment and it would be respected if the researcher’s purpose in engaging future studies on this challenge with different behavioural biases with large samples and in different places to assist the investors in comprehending the typical errors they make while trading in derivative market.

REFERENCES

- [1] Adel, Boubaker, and Talbi Mariem. “The Impact of Overconfidence on Investors’ Decisions.” *Business and Economic Research* 3, no. 2 (August 30, 2013): 53. <https://doi.org/10.5296/ber.v3i2.4200>.
- [2] Aftab, Mahmooda. “Behavioral Biases as Predictors of Investment Decision of Individual Investors in Pakistan.” *SSRN Electronic Journal*, 2020. <https://doi.org/10.2139/ssrn.3619580>.
- [3] Ahmed, Zeeshan, Shahid Rasool, Qasim Saleem, Mubashir Ali Khan, and Shamsa Kanwal. “Mediating Role of Risk Perception Between Behavioral Biases and Investor’s Investment Decisions.” *SAGE Open* 12, no. 2 (April 2022): 215824402210973. <https://doi.org/10.1177/21582440221097394>.
- [4] Ajzen, Icek, and Martin Fisbhein. “Factors Influencing Intentions and the Intention-Behavior Relation.” *Human Relations* 27, no. 1 (January 1974): 1–15. <https://doi.org/10.1177/001872677402700101>.
- [5] Alquraan, Talal, Ahmad Alqisie, and Amjad Al Shorafa. “Do behavioral finance factors influence stock investment decisions of individual investors? (Evidences from Saudi Stock Market).” *American International Journal of Contemporary Research* 6, no. 3 (2016): 159-169.
- [6] Anbukarasi, M., and M. Devaki. “Behavioral Myth of Retail Investors in Commodity Derivative Market—With reference to Coimbatore District.” *JAC: A Journal of Composition Theory* 13, no. 1 (2020).
- [7] Aryal, Nikhil. “Behavioral Biases and Nepali Investors: A Study on the Effect of Biases on the Investment Performance.” *SSRN Electronic Journal*, 2021. <https://doi.org/10.2139/ssrn.3977747>.
- [8] Baker, Harold Kent, Greg Filbeck, and Victor Ricciardi, eds. *Financial Behaviour: Players, Services, Products, and Markets*. Oxford University Press, 2017.
- [9] Barot, Himanshu, and Nilesh B. Gajjar. “Role and Growth of Financial Derivative in the Indian Capital Market.” *International Journal for Research in Management and Pharmacy* 2, no. 6 (2013): 1-23.
- [10] Bellofatto, Anthony, Catherine D’Hondt, and Rudy De Winne. “Subjective Financial Literacy and Retail Investors’ Behavior.” *Journal of Banking Finance* 92 (July 2018): 168–81. <https://doi.org/10.1016/j.jbankfin.2018.05.004>.
- [11] Bhopte, Aradhana, and G. R. R. Impact of Behavioural Biases on Investment Performance. *IJRAR*, 5(3), (2018), 402–405.

- [12] Brooks, Chris, and Louis Williams. "The Impact of Personality Traits on Attitude to Financial Risk." *Research in International Business and Finance* 58 (December 2021): 101501. <https://doi.org/10.1016/j.ribaf.2021.101501>.
- [13] Chabi Gupta, Prof, and Kshama Agarwal. "Investor Biases in Indian Stock Market." *International Journal of Technical Research and Science* 1, no. 5 (2016).
- [14] Chen, Gongmeng, Kenneth A. Kim, John R. Nofsinger, and Oliver M. Rui. "Trading Performance, Disposition Effect, Overconfidence, Representativeness Bias, and Experience of Emerging Market Investors." *Journal of Behavioral Decision Making* 20, no. 4 (2007): 425–51. <https://doi.org/10.1002/bdm.561>.
- [15] Coleman, Les. "Behavioural Biases in Investor Decisions." *Applied Investment Theory*, 2016, 29–52. https://doi.org/10.1007/978-3-319-43976-1_3.
- [16] Dass, J. Behavioural Bias & Its Influence in Finance, Investment & Decision-Making. (2019). 10(1). <https://doi.org/10.16962/Eapjfrm/Issn2349-2325>.
- [17] Dittrich, Dennis A. V., Werner Güth, and Boris Maciejovsky. "Overconfidence in Investment Decisions: An Experimental Approach." *The European Journal of Finance* 11, no. 6 (December 2005): 471–91. <https://doi.org/10.1080/1351847042000255643>.
- [18] Fatima, Afreeen, and Jitendra Kumar Sharma. "Segmenting Investors on Their Biases Manifested in Investment Decision-Making by Individual Investors." *Journal of Management* 4, no. 4 (July 11, 2021): 16–32. <https://doi.org/10.33215/sjom.v4i4.663>.
- [19] Gerth, F., Lopez, K., Reddy, K., Ramiah, V., Wallace, D., Muschert, G., Frino, A. and Jooste, L., 2021. The behavioural aspects of Financial Literacy. *Journal of Risk and Financial Management*, 14(9), p.395.
- [20] GUPTA, CHABI. "Decision Making, Belief and Behavioural Biases." *SSRN Electronic Journal*, 2019. <https://doi.org/10.2139/ssrn.3421635>.
- [21] Gupta, Shilpi, and Monica Shrivastava. "Herding and Loss Aversion in Stock Markets: Mediating Role of Fear of Missing out (FOMO) in Retail Investors." *International Journal of Emerging Markets* 17, no. 7 (November 30, 2021): 1720–37. <https://doi.org/10.1108/ijoem-08-2020-0933>.
- [22] Hair, Joe F., Marko Sarstedt, Christian M. Ringle, and Jeannette A. Mena. "An Assessment of the Use of Partial Least Squares Structural Equation Modeling in Marketing Research." *Journal of the Academy of Marketing Science* 40, no. 3 (June 7, 2011): 414–33. <https://doi.org/10.1007/s11747-011-0261-6>.
- [23] Harrington, Donna. "Assessing Confirmatory Factor Analysis." *Confirmatory Factor Analysis*, October 10, 2008, 50–77. <https://doi.org/10.1093/acprof:oso/9780195339888.003.0004>.
- [24] Hayat, Amir. "Impact of Behavioral Biases on Investment Decision; Moderating Role of Financial Literacy." *SSRN Electronic Journal*, 2016. <https://doi.org/10.2139/ssrn.2842502>.
- [25] Jetti, Ravi Sankar, and D. Bhaskar. "An Exploratory Approach in Identifying Behavioural Biases on Investment Decision Making Towards Capital Markets." *UGC Care Group 1 Journal* 12 (2021).
- [26] Kaiser, Henry F. "An Index of Factorial Simplicity." *Psychometrika* 39, no. 1 (March 1974): 31–36. <https://doi.org/10.1007/bf02291575>.
- [27] Kang, Hao, and Hailong Zhao. "Description and Application Research of Multiple Regression Model Optimization Algorithm Based on Data Set Denoising." *Journal of Physics: Conference Series* 1631, no. 1 (September 1, 2020): 012063. <https://doi.org/10.1088/1742-6596/1631/1/012063>.
- [28] Kanojia, S., and D. Malhotra. "Impact of Behavioural Biases on Investment Performance: A Comparative Analysis of Investors from India, USA and UK." *Journal of Business Thought*, December 8, 2023, 13–33. <https://doi.org/10.18311/jbt/2023/33584>.
- [29] Keith, Timothy Z. "Multiple Regression." *Multiple Regression and Beyond*, January 14, 2019, 44–56. <https://doi.org/10.4324/9781315162348-3>.
- [30] Khan, Imran, Mustafa Afeef, Shahid Jan, and Anjum Ihsan. "The Impact of Heuristic Biases on Investors' Investment Decision in Pakistan Stock Market: Moderating Role of Long-Term Orientation." *Qualitative Research in Financial Markets* 13, no. 2 (February 22, 2021): 252–274. <https://doi.org/10.1108/qrfm-03-2020-0028>.
- [31] Koesrindartoto, Deddy P., Aurelius Aaron, Inka Yusgiantoro, Wirata A. Dharma, and Abdurrohman Arroisi. "Who moves the stock market in an emerging country—Institutional or retail investors?" *Research in International Business and Finance* 51 (2020): 101061.
- [32] Kolmogorov, A. N. "On Logical Foundations of Probability Theory." *Probability Theory and Mathematical Statistics*, 1983, 1–5. <https://doi.org/10.1007/bfb0072897>.
- [33] Kumar, A., Mohapatra, D., & Samal, A. (2021). A Study on The Impact of Behavioral Biases on Investment A Study on The Impact of Behavioral Biases on Investment Decisions of Risk Seeking. August.
- [34] Kumar, Satish, and Nisha Goyal. "Behavioural Biases in Investment Decision Making – a Systematic Literature Review." *Qualitative Research in Financial Markets* 7, no. 1 (February 2, 2015): 88–108. <https://doi.org/10.1108/qrfm-07-2014-0022>.
- [35] Kumar, Satish, and Nisha Goyal. "Evidence on Rationality and Behavioural Biases in Investment Decision Making." *Qualitative Research in Financial Markets* 8, no. 4 (November 7, 2016): 270–87. <https://doi.org/10.1108/qrfm-05-2016-0016>.

- [36] Li, Yubin, Chen Zhao, and Zhaodong(Ken) Zhong. "Trading Behavior of Retail Investors in Derivatives Markets: Evidence from Mini Options." *Journal of Banking & Finance* 133 (December 2021): 106250. <https://doi.org/10.1016/j.jbankfin.2021.106250>.
- [37] Linciano, Nadia. "Cognitive Biases and Instability of Preferences in the Portfolio Choices of Retail Investors Policy Implications of Behavioural Finance." *SSRN Electronic Journal*, 2011. <https://doi.org/10.2139/ssrn.1898560>.
- [38] Madaan, Geetika, and Sanjeet Singh. "An Analysis of Behavioral Biases in Investment Decision-Making." *International Journal of Financial Research* 10, no. 4 (May 6, 2019): 55. <https://doi.org/10.5430/ijfr.v10n4p55>.
- [39] Madaan, Geetika. "Behavioural Biases in Financial Decision-Making." *SSRN Electronic Journal*, 2016. <https://doi.org/10.2139/ssrn.2759187>.
- [40] Manrai, Dr Rishi. "Investor Behavior Towards Derivative Markets in Indian Context." *IOSR Journal of Business and Management (IOSR-JBM)* (2015): 10-14.
- [41] Nadeem, Muhammad Asif, Muhammad Ali Jibrán Qamar, Mian Sajid Nazir, Israr Ahmad, Anton Timoshin, and Khurram Shehzad. "How Investors Attitudes Shape Stock Market Participation in the Presence of Financial Self-Efficacy." *Frontiers in Psychology* 11 (October 22, 2020). <https://doi.org/10.3389/fpsyg.2020.553351>.
- [42] Pallavi, E. V. P. A. S., and T. Kama Raju. "An empirical analysis on perception of retail investors towards derivatives market concerning Visakhapatnam district." *Indian Journal of Management Science* 4, no. 1 (2014): 54.
- [43] Pant, Kamal, and B. Srivastava. "Gender Diversity in Factors Influencing Investment Decisions towards Less-Risky Instruments." *Indian Journal of Economics and Business* 20, no. 2 (2021).
- [44] Patricia Osamor, Ifeoma, Edwin C. Anene, and Qudus Ayotunde Saka. "Impact of Stock Market Liquidity on Herding Behaviour: A Comparative Study of Conglomerate and Consumer Goods Sectors." *Journal of Finance and Accounting* 7, no. 1 (May 21, 2019): 6–11. <https://doi.org/10.12691/jfa-7-1-2>.
- [45] Peterson, Robert A. "A Meta-Analysis of Cronbach's Coefficient Alpha." *Journal of Consumer Research* 21, no. 2 (September 1994): 381. <https://doi.org/10.1086/209405>.
- [46] Pompian, Michael. "Practical Applications of How Much Is Behavioral Advice Worth?" *Practical Applications* 8, no. 1 (April 29, 2020): 1.8-6. <https://doi.org/10.3905/pa.8.1.381>.
- [47] Porter, Ronald D., and Leandre R. Fabrigar. "Factor Analysis." *Psychology*, November 21, 2012. <https://doi.org/10.1093/obo/9780199828340-0077>.
- [48] Rahman, M. Arifur, Shah Saeed Hassan Chowdhury, and M. Shibley Sadique. "Herding Where Retail Investors Dominate Trading: The Case of Saudi Arabia." *The Quarterly Review of Economics and Finance* 57 (August 2015): 46–60. <https://doi.org/10.1016/j.qref.2015.01.002>.
- [49] Rasool, Nosheen, and Safi Ullah. "Financial Literacy and Behavioural Biases of Individual Investors: Empirical Evidence of Pakistan Stock Exchange." *Journal of Economics, Finance and Administrative Science* 25, no. 50 (May 2, 2020): 261–78. <https://doi.org/10.1108/jefas-03-2019-0031>.
- [50] Rathore, Meenakshi, and Anshu Singh. "An Analysis of Behavioural Biases in Investment Decision Making." *Journal of Statistics and Management Systems* 26, no. 6 (2023): 1455–65. <https://doi.org/10.47974/jsms-1161>.
- [51] Rummel, R. J. "Understanding Factor Analysis." *Journal of Conflict Resolution* 11, no. 4 (December 1967): 444–80. <https://doi.org/10.1177/002200276701100405>.
- [52] Rupinder Kaur Gill, Rubeena Bajwa, Rupinder Kaur Gill, Rubeena Bajwa. "Study on Behavioral Finance, Behavioral Biases, and Investment Decisions." *International Journal of Accounting and Financial Management Research* 8, no. 3 (2018): 1–14. <https://doi.org/10.24247/ijafmraug20181>.
- [53] Saleem, Arslan, Muhammad Usman, and Zahid Bashir. "Behavioral Biases, Financial Literacy, and Investment Decision: A Case of Individual Investors in Pakistan." *Business Review* 18, no. 2 (January 1, 2023): 1–19. <https://doi.org/10.54784/1990-6587.1535>.
- [54] Santi, Fitri, Nelsi Valetta Sahara, and Kamaludin. "The Effect of Mental Accounting on Student's Investment Decisions: A Study at Investment Gallery (Gi) Feb University of Bengkulu and Syariah Investment Gallery (Gis) Feb Iain Bengkulu." *Journal of Business Economics* 24, no. 2 (2019): 152–67. <https://doi.org/10.35760/eb.2019.v24i2.1907>.
- [55] Sapkota, Mohan Prasad. "Emotional Biases and Equity Investment Decision of Individual Investors." *Journal of Business and Management Review* 4, no. 1 (January 31, 2023): 036–049. <https://doi.org/10.47153/jbmr41.5682023>.
- [56] Sarathkumar, K., and S. P. Dhandhayuthapani. "Analytical Study on Indian Derivatives Market concerning Investors' Attitude." *International Journal for Innovative Research in Science and Technology* 2, no. 11 (2016): 680-682.
- [57] Sarkar, Arup Kumar, and Tarak Nath Sahu. "Effect of Demographic Factors and Awareness on Investment Behaviour in Stock Market: Evidence from West Bengal." *Asian Journal of Research in Banking and Finance* 7, no. 7 (2017): 34. <https://doi.org/10.5958/2249-7323.2017.00067.0>.

- [58] Sharma, Dhruv, Vandana Mishra, and J.P. Pathak. "Emergence of Behavioural Finance: A Study on Behavioural Biases during Investment Decision-Making." *International Journal of Economics and Business Research* 21, no. 1 (2021): 1. <https://doi.org/10.1504/ijebr.2021.10029893>.
- [59] Shekhawat, A. N. "Emerging Trends in the Indian Derivatives Market, Challenges and Future Prospects" (2019): 6(5), 95–102.
- [60] Shrestha, Noora. "Factor Analysis as a Tool for Survey Analysis." *American Journal of Applied Mathematics and Statistics* 9, no. 1 (January 20, 2021): 4–11. <https://doi.org/10.12691/ajams-9-1-2>.
- [61] Shukla, Anurag, Dr Naela Jamal Rushdi, and Dr Rakesh Chandra Katiyar. "Impact of behavioural biases on investment decisions 'a systematic review'." *International Journal of Management* 11, no. 4 (2020).
- [62] Shukla, Shivam, Asha Ram Tripathi, Sudhir Kumar Shukla, and Akshita Shukla. "The Impact of Self-Serving Bias on Selection of Stocks by Retail Investors in Equity Market: A Study of the Urban Middle Class of India." *European Journal of Business and Management Research* 7, no. 3 (May 3, 2022): 1–6. <https://doi.org/10.24018/ejbmr.2022.7.3.1400>.
- [63] Stolzenberg, Ross M. "Multiple Regression Analysis." *Handbook of Data Analysis*, 2004, 165–207. <https://doi.org/10.4135/9781848608184.n8>.
- [64] Sujesh, C. P. "Influence of Age and Investment Experience on Behavioural Biases of Equity Investors Associate Professor of Commerce Assistant Professor of Commerce. (2021): 9(3).
- [65] Sulistiawan, Dedhy, and Felizia Arni Rudiawarni. "Do Stock Investors Need to Discuss to Reduce Decision Bias?" *Investment Management and Financial Innovations* 16, no. 3 (July 11, 2019): 1–9. [https://doi.org/10.21511/imfi.16\(3\).2019.01](https://doi.org/10.21511/imfi.16(3).2019.01).
- [66] Tekçe, Bülent, and Neslihan Yılmaz. "Are Individual Stock Investors Overconfident? Evidence from an Emerging Market." *Journal of Behavioral and Experimental Finance* 5 (March 2015): 35–45. <https://doi.org/10.1016/j.jbef.2015.02.003>.
- [67] Trang, Phung Thai Minh, and Nguyen Huu Tho. "Perceived risk, investment performance and intentions in emerging stock markets." *International Journal of Economics and Financial Issues* 7, no. 1 (2017): 269-278.
- [68] Upputuri, Sreelekha, M. S. V. Prasad, and Mrs Sandhya Sri. "Investors or Traders Perception on Equity Derivatives." *European Journal of Molecular & Clinical Medicine* 7, no. 06: 2020.
- [69] Venkatapathy, R., and A. Hanis Sultana. "Behavioural finance: Heuristics in Investment decisions." *TEJAS Thiagarajar College Journal* 1, no. 2 (2016): 35-44.
- [70] Verma, Neha. "Impact of Behavioral Biases in Investment Decision and Strategies." *Journal of Management Research and Analysis* 3, no. 1 (2016): 28. <https://doi.org/10.5958/2394-2770.2016.00004.1>.
- [71] Yang, Marvello, Abdullah Al Mamun, Muhammad Mohiuddin, Sayed Samer Ali Al-Shami, and Noor Raihani Zainol. "Predicting Stock Market Investment Intention and Behavior among Malaysian Working Adults Using Partial Least Squares Structural Equation Modeling." *Mathematics* 9, no. 8 (April 15, 2021): 873. <https://doi.org/10.3390/math9080873>.
- [72] Yiwen, Hu. "Impact of Investors' Loss Aversion and Overconfidence on Market Performance Evidence from China Stock Markets." *Advances in Economics, Business and Management Research*, 2021. <https://doi.org/10.2991/assehr.k.211209.330>.
- [73] Zhang, Yixing, Qinmin Jia, and Chen Chen. "Risk Attitude, Financial Literacy and Household Consumption: Evidence from Stock Market Crash in China." *Economic Modelling* 94 (January 2021): 995–1006. <https://doi.org/10.1016/j.econmod.2020.02.040>.
- [74] Zhu, Ning. "Behavioral Biases and Investment Decision Making." *Financial Decision Making*, May 12, 2017, 55–64. <https://doi.org/10.4324/9781315619859-7>.