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Investor Decision making: An In-depth Analysis of Psychological Biases

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Abstract:

The proponents of behavioral finance have critiqued the existing body of literature that upholds the notion of investor rationality in decision-making and challenges the assumptions of efficient markets and rational investor behavior. While diverse research endeavors have delved into the realm of behavioral finance, there remains a need for more extensive investigations in this domain. The current knowledge base primarily addresses isolated behavioral biases encountered by investors during their investment choices. Therefore, this study sets out to construct a comprehensive, robust, and valid scale for gauging the impact of behavioral biases on investors' decision-making processes. To develop such a scale, a meticulous multi-stage approach to scale development was employed. The first stage commenced with an exhaustive literature review, coupled with interviews with seasoned stockbrokers to refine the construct and glean novel insights into the dimensions of behavioral biases. Subsequently, in the second stage, 52 items, designed to measure these dimensions, were generated and evaluated by a panel of experts. The third stage involved pilot testing, resulting in a refined set of 39 items. In the fourth and final stage, data were collected from 332 individual equity investors using a 7-point Likert scale, employing the snowball sampling technique.

The study's findings underscore the multifaceted nature of behavioral biases, significantly influencing investors' decisions. These biases manifest across various dimensions, including Availability Bias, Representativeness Bias, Overconfidence Bias, Market Factors, Herding, Anchoring, Mental Accounting, Regret Aversion, Gamblers' Fallacy, and Loss Aversion. The research has successfully formulated a comprehensive, reliable, and valid scale for assessing behavioral biases affecting the decision-making processes of equity investors. Behavioral finance, particularly in the Indian context, represents a burgeoning field that warrants further exploration. This study primarily focuses on providing researchers with an empirically validated tool for quantifying behavioral biases and their influence on investor decision-making. Such an instrument has the potential to propel advancements in the realm of behavioral finance and prove invaluable to other research initiatives in achieving their objectives.

Keywords: Investor Decision-making, Behavioral finance, Psychological Biases, CFA, Reliabilty and validity

Introduction:

The study of investors' decision-making is a subject that intensified researchers to understand the process and factors that design the investment decisions. The pioneers advocated rationality in the decision-making process, justifying the decisions on the grounds of available information (Fama, 1970; Mintzberg *et al.*, 1976; Merton, 1985). Traditional Finance Theory, Efficient Market Hypothesis and Expected Utility theory have ruled the hearts of financial analysts to answer the queries pertaining to investment decision-making for an aeon (Kumar and Goyal, 2015; Charles and Kasilingam, 2016; Jain *et al.*, 2021). These theories underpin, cultivate and corroborate the age-old concept of rationality in investment decision-making (Fama, 1970; Solnik, 1973). These theories claim that stock prices are the outcome of a company's fundamental values, and thus, if because of some element of irrationality, the inflated/deflated stock prices are not the good reflectors of fundamental values, it will lead to the creation of a gap. This gap will be explored as a risk- free investment opportunity by the investors and eventually, it will eradicate the mispricing to bring back the equilibrium (Tuyon and Ahmad, 2018). The advocates of behavioral finance questioned the existence of efficient markets and rational investors, quoting the stock bubbles and market crashes (Joghee *et al.*, 2020). Behavioral finance puts forward its case by stating that sometimes this mispricing goes unchallenged due to risky and costly strategies.

Behavioral finance garners the evidence from the market to prove the existence of irrational investors in the market whose dominance may hinder the rational functioning of stock markets, investors and their decision-making (Bernstein, 1998; Nofsinger, 2001; Shefrin, 2007). Decades of

study unveiled that investors' decision-making is a complex brew of various biases that directs the investor's behavior while choosing the best from assorted investment options (Bondt and Thaler, 1985; Chang, 2008). The decisions are not always rational, and systematic or cognitive errors can be committed courtesy of behavioral biases (Chen *et al.*, 2007). Several studies reflected recurrent arrays demonstrating irrationality of the decision-making process in uncertain times (Bernstein, 1998; Singh, 2012; Paul, 2014). Psychologists have already condemned rationality in decision-making (Nofsinger, 2001). Jain *et al.* (2019) unearthed the traces of irrationality in the Indian equity market owing to the presence of psychological biases. Economists working in behavioral finance have tried to illuminate different irrational behavior shown by the investors in the financial markets (Chen *et al.*, 2007; Ngoc, 2014). They drew knowledge from the various cognitive behavioral theories on human beings given in psychology, anthropology and sociology. They came up with two major theories in behavioral finance, commonly known as Prospect theory and Heuristics. Nair and Antony (2015) have argued that behavioral finance should be further explored to understand the irrational behavior of investors and explore the reasons behind the sudden rise and fall in the market. A comprehensive scale needs to be developed for measuring all the behavioral biases affecting investors' decision-making process. Such an instrument can contribute towards making progress in the field of behavioral finance, and other researchers may also find it useful to achieve their goals.

Theoretical Framework:

Behavioral finance is an emerging field which is gaining the attention of researchers since the 1980s. It has challenged traditional finance, which claims investors are rational and markets are efficient and perfect. Since then, extensive research is being carried out in this field and significant contributions have been made by various researchers. Various researchers in the field have developed different aspects to measure behavioral biases. The concept of heuristics was proposed by Tversky and Kahneman (1974), which covered anchoring bias, representativeness bias, availability bias. Further, two more dimensions were added in heuristics, namely, overconfidence bias and gamblers' fallacy by Waweru *et al.* (2008). Kahneman and Tversky (1979) proposed a theory named Prospect theory (covering regret aversion, loss aversion, mental accounting and disposition effect), which elaborated how the investors take decisions keeping in view probabilistic alternatives that involve the risk the expected result of the decision is predictable. Some researchers have analysed the impact of herding and market factors on decision-making. Earlier literature shows that investors' decisions are affected by behavioral biases resulting in irrational decisions (Thaler, 1980). This section particularly deals with behavioral biases that creep into while making investment decisions.

Overconfidence bias:

Overconfidence is a common behavioral bias that occurs while making judgements and decisions and has been researched widely by Kahneman and Tversky (1973). Such bias occurs during the investment decision-making process, where people are very sure about their understandings of investment and disregard the risks related to investment. Investors behaving irrationally assume that they can make the best investment decisions based on their information. A group of studies are available which have proved the significant positive impact of overconfidence bias on decision-making behavior (Seo and Barrett, 2007; Bashir *et al.*, 2013; Riaz and Iqbal, 2015; Ullah *et al.*, 2017). Overconfidence sometimes leads to excessive trading and the accomplished profit is not sufficient to cover transaction costs (Odean, 1998; Odean, 1999; Barber and Odean, 2001). Gervais and Odean (2001) have found in their study that overconfidence is dynamic, and it changes according to successes and failures. Further, he added that overconfidence is higher in those who have been trading for a short time, whereas people develop better self-assessments with increased experience. Some studies have studied the difference in overconfidence bias due to demographic factors. Tekçe *et al.* (2016) found that men are more overconfident than women investors. Age, wealth and financial literacy reduce overconfidence.

Representativeness bias:

The considerable research on representativeness bias has been done by Busenitz and Barney (1997), and they have defined representativeness bias as making a generalisation about a phenomenon based on few observations, usually originating from small and non- random samples. Investors tend to invest in the stocks of the companies based on their attributes like quality products, managers as the basis of investment decisions. Andreassen and Kraus (1990), DeBondt (1993) and Lakonishok *et al.* (1994) concluded that investors tend to invest in those shares that have high returns in the past as they consider past returns can predict future gains. Dhar and Kumar (2001) also concluded that investors prefer stocks with abnormally high returns compared to stocks having normal returns. Grether (1980) further added to the existing literature on representativeness bias by concluding that this bias generally affects inexperienced investors more as compared to others. Chen *et al.* (2007) found that representativeness bias is found in individual investors and not in institutional investors. However, Tekçe *et al.* (2016)

gave a contradictory view that investors do not chase the positive recent returns, and investors' experience further decreases representativeness bias.

Anchoring bias:

Although anchoring bias has been researched widely, but a significant contribution has been made by Tversky and Kahneman (1974), who defined the presence of anchoring bias as a situation when people make estimates based on an initial value called as the reference point. Anchoring refers to human inclination to trust limited information like news or volume of trading or one-day returns) while making the investment (Andersen, 2010). This bias entices investors to attach or anchor importance to a reference point which may be a past event or trend. Investors generally anchor by considering the recent high price of the stocks as the reference point. So, if the price drops as compared to the reference point, investors tend to invest in the stock at a discount (Vasile *et al.*, 2010). Anchoring is correlated with representativeness as investors get dependent on their experiences from the recent past, and they become optimistic when prices increase and go pessimistic during fall in the market (Shiller, 1999). Investors also predict the earnings of the company based on past trends (Waweru *et al.*, 2008).

Availability bias:

Tversky and Kahneman (1974) have coined the concept of availability bias. They have defined availability bias as a circumstance where people evaluate the frequency of a class or the chance of an event by the ease with which such instances or occurrences come to their mind. This behavioral finance bias occurs when investors overweigh the available evidence and determine the possibility of similar events. It refers to memorising the instances which are related to attention. This results in investors' overreaction to the market movement, which may be upward or downward. A cognitive bias compels investors to over predict the chances of events depending upon memorable events (Jahanzeb, 2012). Moradi *et al.* (2013) concluded an interrelationship between personality dimensions and availability bias in the Tehran stock exchange.

Gambler's fallacy:

Waweru *et al.* (2008) broadened the scope of heuristics by introducing the concept of the Gamblers' fallacy to the field of behavioral finance. It is people's inappropriate belief regarding the reversal of a trend. This may lead investors to anticipate the end of a good or poor run of market returns. It is a misconception that if an event happens in the past more often than predicted, there will be fewer chances of its occurrence in the future. This is also known as the Law of Small Numbers or Monte Carlo Fallacy. When an investor takes a decision based on limited information, it shows his trust in the law of small numbers (Tversky and Kahneman, 1974; Hogarth, 1987). Huber *et al.* (2010) found a significant effect of this bias on investors' decisions. Earlier research has proved that investors make over- optimistic estimates based on limited positive information (Barnes, 1984; Kahneman and Lovallo, 1993; Canner *et al.*, 1997). Rakesh (2013) has analysed its impact on returns and has concluded that gamblers fallacy affects investors' expectations, adversely impacting investment returns. Amin *et al.* (2009) have also found that gamblers fallacy bias has contributed to irrational decisions in Lahore.

Regret aversion:

Regret theory was proposed in 1982 by different authors (Fishburn, 1982; Bell, 1982; Loomes and Sugden, 1982), which led to the emergence of the concept of regret aversion. Regret aversion represents a bias where an investor suffers from the regret of investing in a wrong stock when the return from the alternative foregone stock is better. Regret aversion bias induces investors to avoid actions because of the fear of wrong decisions. Investors avert regret by not selling decreasing shares and selling upward-moving shares. This emotion of regret becomes stronger when they hold losing stocks for a more extended period and sell the increasing ones early (Lehenkari and Perttunen, 2004; Fogel and Berry, 2006). Shefrin and Statman (1985) explored that this bias encourages investors to invest in stocks that give dividends on a regular basis. Earlier literature shows the positive role of risk aversion in investment decisions (Lim, 2012; Khan, 2017).

Loss aversion:

Tversky and Kahneman (1991), the major contributors in the field of behavioral finance, defined loss aversion as a notion that losses loom bigger than equivalent gains. This bias proves that investors are loss averse who prefer to save the capital instead of focussing on increasing it. Investors are more affected by losses, whereas they are less happy with an equal amount of gains (Barberis and Thaler, 2003). This bias leads investors to become risk- averse when the loss occurs, and resultantly, they sell the shares after a slight shift in price and make irrational decisions (Odean, 1998; Kahneman *et al.*, 1991). Earlier research proves that this bias affects investors' decisions (Kengatharan and Kengatharan, 2014; Ngoc, 2014). This bias has been found to affect female investors more than male investors (Blavatskyy and Pogrebna, 2008; Hassan *et al.*, 2014). Even foreign direct investment (FDI) real estate investors also confront this bias while making investment decisions (Joghee *et al.*, 2020).

Mental accounting:

Thaler (1980) coined this concept of mental accounting bias, which means investors treat each element of their investment portfolio separately. They assign different costs to different transactions,

and they evaluate these transactions by analysing the mental impact of these costs. Investors usually tend to avoid losses because their sentiments are much more intense in case of losses than in case of profits. Losses cause more mental burden, which is challenging to overcome, and hence, investors avoid investing more chances of losses (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). Mehra and Prescott (1985) have defined this as an equity premium puzzle which explains that loss-averse behaviour caused by mental accounting bias makes investors myopic on losses.

Herding bias:

Herding is a bias where investors mimic the decisions of others, generally a larger group, while making decisions (Spyrou, 2013). Nofsinger and Sias (1999) defined herding bias as investor's behaviour mimicking the decisions of others. Individual investors follow herding behaviour than institutional investors (Kim and Wei, 2002; Lee *et al.*, 2004; Goodfellow *et al.*, 2009). Earlier literature has explored two types of herding behaviour, namely, irrational or intentional herding and rational or spurious herding. The reasons for rational herding may be the same choice for a share and similar response to the news, incentives for fund managers. Intentional herding involves copying other investor's decisions without analysing available information. Intentional herding is more prominent in individual investors, as evident in earlier literature than institutional investors (Kim and Wei, 2002). Goodfellow *et al.* (2009) gave an interesting finding that the herding effect is shown more during market downswings and during market upswings but to a lesser extent.

Market factors:

The market factors like available market information, fundamentals of the stocks, events of market and stock prices can impact the response of investors to change in price (Waweru *et al.*, 2008). Market factors highly affect investors' decisions, as evident in earlier literature (DeBondt and Thaler, 1985; Odean, 1998; Lai *et al.*, 2001; Waweru *et al.*, 2008). Investors invest in best-selling shares considering important events of the stock market (Waweru *et al.*, 2008). Barber and Odean (2000) found that investors base their decisions on market events that have nothing to do with the future performance of such stocks. A thorough review of the literature shows that extensive research has been conducted on behavioral biases affecting the investors' decision-making process worldwide. Some studies have been conducted taking heuristics bias (covering overconfidence bias, representativeness bias, anchoring bias, availability bias and gamblers' fallacy) as independent variables affecting investors' decision-making process (Chen *et al.*, 2007; Kliger and Kudryavtsev, 2010; Matsumoto *et al.*, 2013; Riaz and Iqbal, 2015; Tekçe *et al.*, 2016; Ullah *et al.*, 2017). A group of studies is available that have focussed on the effect of prospect theory (covering regret aversion, loss aversion, mental accounting and disposition effect) on investors' decisions (Kahneman and Tversky, 1979; Waweru *et al.*, 2008; Richards *et al.*, 2011; Zona, 2012). A good number of studies are available analysing the impact of herding on investment decisions (Dennis and Strickland, 2002; Caparrelli *et al.*, 2004; Lee *et al.*, 2004; Lim, 2012; Kengatharan and Kengatharan, 2014). Some studies have focussed on individual biases like Andersen (2010) has focussed on anchoring bias, Shefrin and Statman (1985) has analysed the disposition effect and Khan (2017) have focussed on availability bias and loss aversion and Rakesh (2013) has analysed gamblers' fallacy. The available research on behavioral biases has somehow not covered all the behavioral biases that can affect investors' investment decisions. Hence, the present study is an attempt to develop a comprehensive, reliable and valid scale to measure the behavioral biases affecting investors' decision-making process.

Scale development methodology:

The present study aims at developing a reliable and valid scale for measuring different behavioral biases of individual equity investors, which affect their decision-making process. For developing the scale, rigorous stages of scale development, as mentioned in the research study by Papadas *et al.* (2017), have been followed. A multistage procedure has been followed to develop the scale, as displayed in Figure 1.

Stage I – Construct definition and content domain:

A careful analysis of the literature is required for construct definition (Netemeyer *et al.*,2003). A deep understanding of the behavioral biases was obtained, and their various dimensions were explored, namely, heuristics biases (covering overconfidence bias, representativeness bias, anchoring bias, availability bias and gamblers' fallacy), prospect theory (covering regret aversion, loss aversion and mental accounting), herding bias and market factors after an extensive review of the literature. To gain further understanding of the dimensions measuring various behavioral biases, in-depth interviews were conducted with 20 experienced stockbrokers. This qualitative analysis consisting of extensive literature review and in-depth interviews helped in clarifying the construct and providing novel insights about its 10 dimensions.

Stage II – Item generation and expert review:

During this stage, items measuring various dimensions of behavioral biases were generated after a thorough literature review and analysis of the interviews. This process generated 52 items. Due consideration was paid while framing statements to

get the response. For ensuring content and face validity, a panel of judges was made to get the items appraised. The panel of judges included five experienced stockbrokers, five experienced equity investors and two doctoral researchers in the field of behavioral finance. They had to evaluate the items on a five-point scale in terms of representativeness, specificity and clarity (Haynes *et al.*, 1995). In total, 42 items that scored three out of five were retained for further analysis. Some of the items were rephrased as per the suggestions given by experts.

Stage III – Scale purification and item refinement:

Once the experts thoroughly judge, modify and trimmed the items, pilot testing of items should be done from the relevant population of interest (Clark and Watson, 1995). A pilot survey was conducted from 50 equity investors having experience of three years to increase the authenticity of the questionnaire and to ensure the right wording as well as sequencing of the statements. After stage two, the scale contained 42 statements measuring behavioral biases, but three were dropped after the pretesting as these were found inappropriate. A final set of 39 items were retained for the next and final stage of the scale development process.

Stage IV – Finalisation of scale:

Finally, to confirm the dimensionality, reliability and validity of the scale, a large quantitative study was conducted. The survey instrument contained 39 statements measuring different behavioral biases to be answered on a seven-point Likert Scale where seven stands for Strongly Agree and one for Strongly Disagree. Data were collected from the states of Punjab, Himachal Pradesh and Haryana (India). Snowball sampling technique was used to select the sample. Respondents for the present study included individual equity investors with having investment portfolios and at least three years of investment experience. The survey instrument was distributed to different equity investors through brokers and investment advisors. The data were collected between April 2021 to May 2021. A total of 800 questionnaires were distributed to the selected equity investors, out of which 337 were returned, from which 332 questionnaires were usable. The remaining five questionnaires were incomplete; therefore, these were not considered for the study. The effective response rate was 41.5% which was considered satisfactory.

Analysis and interpretation:

Analysis technique:

As the survey instrument was self-structured, therefore, firstly, exploratory factor analysis (EFA) was run through predictive analytics software (PASW) to club the statements measuring behavioral biases which affect investors' decisions into factors. The critical step involved in the development of a scale is checking the reliability and validity of the scale. Hence, a measurement model under structural equation modelling was specified and run as confirmatory factor analysis (CFA) through analysis of a moment structures (AMOS) to check the reliability and validity of the scale.

Sample characteristics:

Complete responses were collected from 332 respondents. Out of the 332 responses collected, 242 respondents were men, whereas 90 were women. In total, 74% of the total respondents were found to be in the range of 25–50 age group. In total, 26% of respondents fall in the age group of below 25 and above 50. Most of the respondents (74%) were found to be either graduate, postgraduate or higher educational qualifications. As regard the annual income of the respondents, 38% of them were in the range of US$2,500 to US$6,500. In total, 87% of the respondents were found to be having more than five years of stock market experience. The important highlights regarding the demographic profile of the respondents are depicted in Table 1 given below.

Reliability analysis:

Reliability repeated measurements are conducted on the characteristic (Malhotra and Dash, 2016). In the present study, the internal consistency and reliability have been checked with the help of Cronbach's alpha statistic and composite reliability (CR). For any scale to be reliable, Cronbach's alpha and CR should be more than 0.7 (Malhotra and Dash, 2016). Cronbach's alpha, as well as CR, were found to be more than 0.8 for all the constructs, proving the reliability of the scale. The results for the same are presented in Table 3.

Exploratory factor analysis:

EFA was applied to identify the underlying dimensions measuring behavioral biases affecting the investment decision-making of the individual equity investors. The initial assumptions of the EFA test were found to be satisfactory as depicted by the Bartlett test of sphericity (chi-square = 7,786.947, df = 741, significance = 0.000) and the Kaiser-Meyer-Olkin test for measuring the sampling adequacy (value = 0.822). It was found that significant correlations existed between the variables and the sample is adequate for further analysis. Sampling adequacy for individual variables was checked through an anti-image correlations matrix and was found significantly high for all the variables considered for the study. EFA was run with varimax rotation and factors with eigenvalues of more than one were selected (Hair *et al.*, 2012) and were considered for the final analysis. In total, 10 factors were identified altogether, explaining 75% of the variance, namely, Availability, Representativeness, Overconfidence, Market, Herding, Anchoring,

Mental Accounting, Regret Aversion, Gamblers' Fallacy and Loss Aversion, as shown in Table 2.

Table 1

Gender	
Male	73.0%
Female	27.0%
Age	
Below 25	15.4%
25-30	41.6%
35–50	32.2%
Above 50	10.8%
Educational qualification	
Higher education	26.2%
Graduate	41.3%
Postgraduate or higher	32.5%
Annual income	
Below US$2,500	22.2%
US$2,500–US$6,500	37.8%
US$6,500–US$12,500	35.8%
>US$12,500	4.2%
Experience in stock market	
3 to 5 years	12.8%
5 to 10 years	35.2%
10 years or above	52.0%

Confirmatory factor analysis:

For checking the uni-dimensionality of a scale (i.e. the magnitude to which all the variables in a factor measure the construct), CFA is a more appropriate technique than EFA. It, hence, is more used in the construct validation process. In this study, the measurement model has been run by applying CFA (displayed in figure 2) by using the AMOS software and the essential statistics are presented in Table 3. As CFI (comparative fit index) values for all the constructs are greater than 0.90, showing the fitness of the CFA model. Different types of validity have also been checked, which is briefly summarised as under:

Content validity:

Content validity ensures whether a measure represents all the dimensions of a construct (Rungtusanatham, 1998). Content validity can be checked using the services of recognised subject experts to check whether test items reflect the knowledge required for a chosen subject. Content validity of the scale has been checked for the present study, as statements measuring behavioral biases were derived from the literature and reviewed by academicians and professionals. Constructs and variables have been decided for the study after getting the advice received from the experts.

Construct validity:

If a scale measures what it tends to measure, construct validity is ensured. It is an analysis of the extent to which variables are measured by the construct correctly (O. Leary-Kelly and Vokurka, 1998). In the present study, a measurement model was prepared for all the constructs and CFA was applied after drawing the co-variances for all the constructs. Uni-dimensionality can be checked through CFI value. If the CFI value is more than 0.9, there is a solid indication of uni-dimensionality. In the present study, CFI values for all the 10 constructs of the scale are found to be above 0.90, as presented in Table 3.

Convergent validity:

It is the degree to which distinct assessment techniques agree to in their measurement of the same trait (Byrne, 2009). For checking the convergent validity, the average variance extracted (AVE) is calculated. It is the average amount of variance that a construct explains in the indicator variables. For achieving convergent validity following conditions must be satisfied:

- CR should be larger than the AVE.
- AVE should be more than 0.5 (Hair *et al.*, 2012).

The statistics are presented for all 10 dimensions in Table 3. In the present study, both the above-mentioned conditions are satisfied, revealing strong evidence of convergent validity.

Discriminant validity:

Campbell and Fiske (1959) introduced the concept of discriminant validity, which is used to check the uniqueness for the measures of different constructs and distinctness of the one construct from the other constructs, and thus, it proves to be a unique contribution. Discriminant validity ensures that one measure does not highly correlate with the other measures. For establishing discriminant validity, the following conditions must be satisfied: AVE for every construct should be more than MSV (maximum shared variance). AVE for every construct should be more than ASV (average shared

variance) statistics (Hair *et al.*, 2012). As depicted in Table 3, AVE for each construct is higher than MSV as well ASV statistics, thereby exhibiting discriminant validity of the scale.

Conclusion:

The objective of the study was to develop a reliable and valid scale for measuring behavioral biases affecting the investment decision-making of individual equity investors. The study is the first attempt to conceptualise and operationalise the concept of behavioral biases affecting the investment decision-making process. The proposed measurement tool has been developed and validated after following rigorous multistage scale development methodology. A thorough review of literature helped in construct definition and qualitative analysis of interviews conducted gave novel insights into dimensions. Further items were generated based on 10 dimensions identified from qualitative analysis as well as a review of literature and refinement procedures were followed to trim down the items measuring various behavioral biases. EFA was run to determine the underlying factors measuring behavioral biases that affect investment decisions of the individual equity investors, which extracted 10 dimensions, namely, Availability, Representativeness, Overconfidence, Market, Herding, Anchoring, Mental Accounting, Regret Aversion, Gamblers' Fallacy and Loss Aversion. CFA was used to check the reliability and validity of the scale and results were found to be satisfactory. Hence, the present research has developed a reliable and valid scale for measuring behavioral biases affecting equity investors' decision-making process. The intention behind conducting the study was to conceptualize behavioral biases of individual equity investors, provide a new reliable and valid scale to measure it and provide data- based evidence on how it affects the investment decision-making process. The research has contributed to a more refined knowledge base of the dimensions of behavioral biases. It has made an addition to the existing work in the field, which was confined to specific biases or theories.

Implications of the study:

From a theoretical perspective, our research augments the existing knowledge base on the usage of a validated scale to measure behavioral biases affecting individual equity investors' decision-making process. This reliable and valid tool would bring standardisation in the behavioral finance research domain. Further, researchers can use this scale to assess the behavioral biases encountered by individual equity investors while making investment decisions in other developing countries. This scale can also be used to facilitate comparisons of the results yielded by several research studies in the field of behavioral finance. The scale has been developed by using data collected from individual equity investors. Researchers can make use of the same scale for analysing the behavioral biases of the institutional investors also. As earlier studies have recommended the study of behavioral biases in the mediating role between financial literacy and investment decision-making, this instrument can further be customised to fill this research gap. In nutshell, the present research has augmented the available research based on behavioral biases in the field of behavioral finance. Behavioral finance is an emerging field that is capturing the attention of researchers, but a comprehensive study covering major behavioral biases can certainly add to the existing knowledge base. As far as managerial implications are concerned, the scale can be very useful for financial advisors, investors and policymakers.

Financial advisors can assess various behavioral biases affecting the decision-making of individual equity investors and provide the required feedback to investors for improving their investment decision-making process by minimising the biases. In this way, investment outcomes of individual equity investors can be enhanced, resulting in augmented wealth creation. Investors will also find the scale useful because they can have a check on the biases that they unintentionally can commit while making equity investment decisions. The awareness of biases will ultimately result in the minimisation of biases leading to effective decision-making. This is recommended to the investors that they should maintain a map of behavioral biases to which they are likely to be exposed, even after attaining a satisfactory awareness level. This needs to be checked on a regular basis to recollect and update their memories, and thus, give them a greater chance of making better decisions in the stock market. Knowledge of behavioral distortions and their implementation in investment decision-making will increase the logic of investment decisions and thereby make room for higher market performance. Such scale can be beneficial to the policymakers as well, as it will augment their knowledge about the biased behaviour of the investors during different market conditions. This would suggest education for individual investors, as this would overcome unfavourable investing consequences resulting from behavioral biases. The focus should be on conducting more and more training programmes for potential and existing individual investors, which will create awareness among the investors and guard against behavioral biases and will ultimately help investors in making sound investment decisions.

Limitations and directions for future research:

The present study does suffer from certain limitations. While developing a scale for measuring the impact of the behavioral biases on the equity investors' decision-making process, neither mediator nor moderator variables were considered.

However, this is a limitation of the study but can serve as a direction for future research. Future research can be undertaken for analysing the role of mediators like risk perception, risk tolerance and moderator variables like financial literacy, investment experience, gender in the given hypothesis. Continuous refinement of the scale proposed and supported in this study is possible based on further research and time to time changes occurring in the field of behavioral finance.

Table 2.

Sr. no.	Factor-wise dimensions	Factor loadings	Mean	SD	Eigenvalue	(%) of variance explained	Cumulative percentage of variance
F1	Availability				4.545	11.654	11.654
AV1	If someone has told you that a financial crisis is about to happen in a year'stime, you would be convinced	0.862	4.515	2.100			
AV2	You prefer to buy stocks on the days when the value of the index increases	0.868	4.605	1.999			
AV3	You prefer to invest in stock which has been evaluated by well-known experts	0.811	4.593	1.816			
AV4	You prefer to buy local stocks than trade in international stocks	0.879	4.569	2.078			
AV5	You prefer to sell stocks on the days when the value of the index decreases	0.870	4.557	1.966			
AV6	Your investment decision depends on new and favourable (positive) information released regarding the stock	0.828	4.713	2.104			
F2	Representativeness				3.292	8.441	20.095
REP1	You prefer to invest only in familiar stocks	0.814	4.587	1.902			
REP2	Even if your best researched stock does not perform according to your expectations, still you	0.730	4.548	1.878			
REP3	hold the same You use trend analysis to make investment decisions	0.803	4.593	1.915			
REP4	If other stocks of a company are performing well and the same company offers new shares, you will buy the	0.741	4.575	1.885			
REP5	same	0.814	4.602	1.911			
	you buy "hot" stocks and avoid stocks that have performed poorly in the						
	recent past						
F3	Herding				3.135	8.040	28.135
HERD1	Other investors' decisions of choosing stock types have an impact on your	0.880	4.334	2.082			
	investment decisions						
HERD2	Other investors' decisions of the stock volume have an impact on your	0.875	4.340	2.136			
	investment decisions						
HERD3	You usually react quickly to the changes of other investors' decisions and	0.834	4.313	2.048			
	follow their reactions to the stock market						
HERD4	Other investors' decisions of buying and selling stocks have an impact on	0.871	4.488	2.153			
	your investment decisions						
F4	Market				3.123	8.008	36.142
MKT1	You have over-reaction to price changes of stocks	0.897	4.512	2.060			
MKT2		0.865	4.397	2.082			
	You carefully consider the price changes of stocks that you intend to invest in						
MKT3	You analyse the companies' customer preference before you invest in their	0.860	4.301	2.227			
	stocks						
MKT4	Market information is important for your stock investment decision	0.853	4.599	1.831			
F5	Overconfidence				3.036	7.784	43.926
OC1	You believe that your skills and knowledge of the	0.823	4.942	2.041			

OC2	stock market can help you to outperform the market You know the best time to enter and to exit your investment position from	0.830	4.445	2.058			
OC3	the market You feel more confident in your own investment opinion over the opinion	0.859	4.478	2.105			
OC4	of your colleagues or friends You trade frequently than other people	0.859	4.620	2.103			
F6	Anchoring				2.779	7.126	51.052
ANC1	You usually invest in a stock that has fallen considerably from its previous closing or all times	0.785	4.533	1.994			
ANC2	high You use the purchase price of stocks as a reference point in trading	0.840	4.617	1.912			
ANC3	You rely on my previous experiences in the market for making next investment	0.795	4.581	1.956			
ANC4	You forecast the changes in stock prices in the future based on recent stock	0.789	4.731	1.877			
	prices						
F7	Mental				2.377	6.094	57.146
MA1	accounting You tend to treat each element/account in your investment portfolio separately	0.852	4.575	2.006			
MA2	You Sell losing investment from your portfolio	0.857	4.421	1.934			
MA3	You ignore the connection between different investment possibilities	0.842	4.620	1.877			
F8	Regret aversion				2.359	6.049	63.194
RA1	You sell shares that have increased in value faster	0.848	4.472	1.915			
RA3	You feel more sorrow about holding losing stocks too long than about selling winning stocks too soon	0.831	4.551	2.046			
F9	Gamblers'				2.332	5.978	69.173
GF1	fallacy You tend to ignore the benefits that can accrue by investing in different investment options	0.835	4.301	2.213			
GF2	After a fall in the market for few days consecutively, you believe that now	0.873	4.506	1.758			
GF3	the market will move upwards You are normally able to anticipate the end of good or poor	0.847	4.394	1.978			
F10	Loss aversion				2.272	5.825	74.998
LA1	When faced with a sure gain, you are risk-averse	0.865	4.503	2.035			
LA2	When faced with a sure loss, you are a risk-taker	0.833	4.433	1.966			
LA3	You avoid selling shares that have decreased in value and readily sell shares that have increased in value	0.808	4.355	1.944			

Table 3.

Reliability and validity statistics	Constructs	Cronbach's a	CR.	AVE	MSV	ASV	CFI
	Representativeness	0.860	0.861	0.554	0.081	0.044	0.988
	Anchoring	0.841	0.842	0.572	0.103	0.040	1.000
	Availability	0.932	0.932	0.697	0.059	0.028	0.942
	Gamblers_Fallacy	0.845	0.849	0.653	0.104	0.035	1.000
	Loss_Aversion	0.834	0.840	0.639	0.108	0.046	1.000
	Regret_Aversion	0.859	0.859	0.671	0.135	0.052	1.000
	Herding	0.902	0.903	0.699	0.071	0.025	1.000
	Market factors	0.899	0.901	0.695	0.033	0.016	0.975
	Mental_Accounting	0.861	0.861	0.674	0.135	0.052	1.000
	Overconfidence	0.891	0.892	0.674	0.104	0.046	0.996

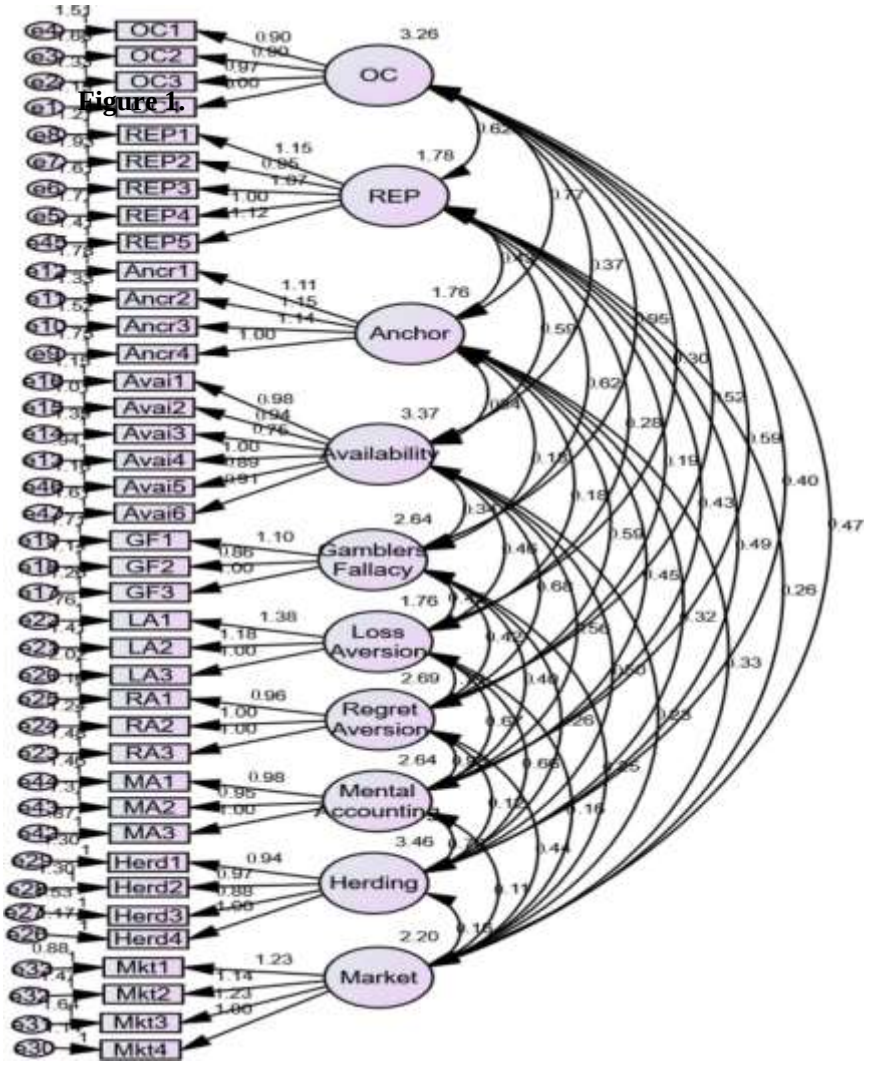

Figure 1.

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