LINKING ESG-INVESTING CONSCIOUSNESS, BEHAVIORAL BIASES, AND RISK-PERCEPTION: SCALE VALIDATION WITH SPECIFICS OF INDIAN RETAIL INVESTORS

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ABSTRACT

The research focuses on the calibration and measurement of the relationship between the selected behavioural biases and the risk perceptions of Indian retail investors, as well as its ultimate implications on equity investment decisions. Further, it examines the association of the factors to non-financial determinants such as ESG investing consciousness. The research leveraged a structured questionnaire for data collection across 438 samples. EFA for factor-extraction and assessing dimensional validity; CFA for understanding the factor structure, the validity & reliability of the latent variables; and AMOS-based SEM for the establishment of path analysis and structural causal relationships amongst the variables are used for the study. The study confirms the significant impact of risk perception on equity investment decisions and establishes a significant link between the selected biases for the study and the perceived risk. The findings also indicate a statistically significant relationship between ESG consciousness and the risk perception of investors. Further, there is confirmation of a statistically significant negative moderation effect of ESG consciousness on the relationship between the selected biases and investors' perceived risk, indicating that higher ESG consciousness weakens the positive relationship between investors' perceived biases and risk perception.

KEY WORDS

ESG investment, risk perception, behavioral biases, availability bias, herding bias, aversion bias, gambler's fallacy, overconfidence, anchoring bias

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1 INTRODUCTION

The measurement of retail investors' ESG (Environmental, Social, and Governance) investment consciousness, ecological and social sensitivity, and adherence to ESG protocols have emerged as a new field of academic research. The ESG investing phenomenon stems from non-financial global concerns such as climate change, environmental conservation, hydrocarbon reduction, consideration for people and relationships, social welfare, and moral standards for business operations (Tsagas, 2020). The environmental aspect pertains to the internal policies that the firms are implementing to ensure minimal environmental damage, possible mitigation of climate change, and environmental conservation. Corporate social policy addresses the potential impact of corporate actions on societal well-being. Similarly, the governance aspect addresses corporate structures and procedures that direct and regulate businesses (Vicente-Ortega Martínez, 2021). The ESG phenomenon was prevalent in the ancient philosophy of responsible business, but the formal consensus emerged only in the 1990s (Sharma, 2016). The Kyoto Protocol, the World Economic Forum's emphasis on climate change, and the United Nations' Sustainable Development Goals are among the formal measures promoting retail investors' ESG awareness (OECD, 2021).

Hence, ESG investing is here to stay, and its multifaceted intervention in investors' behaviour is a matter for study. ESG aspects are gaining currency in retail investment decisions on account of viability, sustainable business models, and rising awareness about saving the planet and doing good for overall humanity. The retail investor and their aspirations have widened to include environmental and societal agendas in investment decision-making. They started to echo the predilection for sustainability in business investments (Mottola et al., 2022; D'Hondt et al., 2022). Despite the lack of a standardised ESG model for investment undertakings, ESG consciousness is undeniable and rampant as the investor population becomes aware and conscious of global trends (Amel-Zadeh and Serafeim, 2017). The rising ESG consciousness has led to deviations in the investor's information processing, cognition development, and belief enrichment concerning the investment undertaken. The studies are now being conducted from a pro-environment perspective rather than a conventional perspective (Polman and Winston, 2022).

Simultaneously, investor behavioural biases are fast becoming recognised as an imperative trait for investment decisions. Behavioral science researchers have established that numerous biases formulate the theme for the decisions and risk analysis of investors (Montibeller and von Winterfeldt, 2015; Tversky and Kahneman, 1973). Numerous empirical studies in the field of behavioural finance have revealed findings that both retail and institutional investors consistently deviate from making rational investment decisions. Investors' behavioural biases are deviations in how they absorb information, feel, and think, which can have an adverse impact on their decision to invest rationally by raising idiosyncratic risk and degrading portfolio performance (Kumar and Goyal, 2015; Sivaramakrishnan et al., 2017). Individuals as agents are susceptible to influences from social actors' beliefs, norms, and assumptions (Neal et al., 2022). As per the behavioral finance school of thought, investors, on account of their limited cognitive and emotional capabilities and lack of strong rationality, seem to act in ways that are rarely regarded as optimum. They seem to be externally driven by a preset agenda (Hohenberger et al., 2019). The 'choice architecture' entails the act of influencing and making a judgement by organising available material amidst limited availability of information relevant to decisions, limited capability to analyse and compare alternative choices, and constrained attention and self-control (Jurevičienė and Ivanova, 2013; Thaler et al., 2013). The intent to pre-judge forms a major component of these so-called choice architectures that are cognitive and emotional in nature and are widely identified as behavioural biases. As such, biases could imply ignoring important informa-

tion, treating irrelevant aspects as imperative, incorrectly weighting information, finding false correlations, creating false memories as the sole basis for decision making, or being swayed away by social groups and pressures, or misjudging the desirability of outcomes (Wangzhou et al., 2021). Human thinking, as evident in the form of dual cognitive processes, is observed to inculcate a quick, involuntary, emotionally-driven, intuitive process and a slow, calculative, logic-based, deliberative process. This drives individual decision-making while allocating funds, rationalising portfolios, and maintaining investments (Kvaran et al., 2013; Kahneman, 2013). Therefore, biases can be understood as the obvious distortions of judgements that deviate from expected utility or normative principles of probability, which are otherwise adequately represented by traditional finance and economics theories (Korteling et al., 2018).

As an investment influencer, ESG belief and concern play a role in churning risk perception, belief creation, information processing, and the usual commitment of biases during investment decision making. The widespread media support for ESG accountability of firms and investor-related activism is fueling the role of non-financial aspects as outweighing the financial-driven agenda in stock selection (Friede, 2019). In addition to performance analyses, a tiny segment of empirical studies has looked into the traits, motivations, and investment strategies of ESG investors both at individual and institutional levels. According to Renneboog et al. (2011), ESG mutual funds investors exhibit less bias toward past financial success than conventional investors, and as a result, biases based on historical results are less common among these investors. Beal et al. (2005) looking into why particular investors choose to invest in ESG. discovered that the primary motivations for investing in social concerns are largely money returns, social transformation, and non-wealth returns. Putting it in another way, in addition to financial gains as a received return, investors value the sense of helping others or supporting a worthwhile cause. Nilsson (2009) examined the justifications for investors to put money into ESG mutual funds in yet another significant study. They discovered that ESG investors are a heterogeneous group made up of three different investor types who are predominantly motivated by (i) financial considerations, (ii) mixed objectives, and (iii) altruistic motivations. Daugaard (2019) stated that even if ESG investments do worse than their conventional counterparts, investors in ESG would keep their ESG investments.

The existing literature acknowledges and recognises that the behavioural aspects of retail investors, their investment choices, and risk perception are multifaceted constructs that include numerous environmental influences and that bind well with non-financial components of ESG investing consciousness. Non-financial aspects are positioned as exerting extensive intervention in the determination of financial decisions, individual risk awareness, and the construction and preservation of beliefs (Masini and Menichetti, 2013; Naveed et al., 2020). However, the existent academic literature has differing views in relative association concerning the quantification of the relationships across the chosen variables for the study: investors' behavioural biases, risk perception, ESG consciousness, and their investment intentions. The focus on Indian retail investors and the peculiarity of Indian ESG-oriented retail investors are lacking from the existing studies on the topic, which are more focused on the developed economies. Although, India is witnessing a growing financial market, a glaring population research gap with the phenomenon's conceptualization is seen. There appears to be a scarcity of existing literature on quantitative and empirical analyses of the interactions between behavioural and ESG investment paradigms. Additionally, a vast section of behavioural finance research uses information from investor trading records. However, primary data, as opposed to secondary data, is a more reliable predictor of investor behaviour (Ritika and Kishor, 2020). By utilising primary data and concentrating explicitly on the behavioural factors of Indian individual investors, the study seeks to close this gap.

The broad focal point of the research is conceptualising, developing, and validating a scale for calibration and measurement of association between the selected factors for the study. It is dedicated to studying the impact of Indian retail investors' selected behavioural biases on their risk perceptions and their ultimate implications on the undertaking of equity investments from a post-pandemic perspective. Further, the work aims to study how biases and risk perception are associated with non-financial determinants such as ESG investing consciousness.

2 THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESIS

The constructs of investors' decision-making behavior are borrowed extensively from the literature works of behavioral finance. The studies posit the core role of biased influences such as "availability bias", "gambler's fallacy", "overconfidence bias", "anchoring bias", "herding bias", and "regret aversion bias" (Tversky and Kahneman, 1973; Costa et al., 2017; Stöckl et al., 2015) to be dominant in investor's decision-making patterns. Investment decision-making is a cognitive and emotional process to choose among the available alternative scenarios. The problem of effective interpretation and decoding of the investor's decision-making patterns has always remained a puzzle across behavioral science research (Montibeller and von Winterfeldt, 2015). The behavioral biases and irregularities that are been observed, yet are not alone in influencing retail investors' stock market participation. The traits of risk perception and ESG investing consciousness have been observed to shape the level and depth of equity market decisions (Lucarelli and Brighetti, 2010; Gajdošová, 2011). The study hence proposes the research model as demonstrated in Fig. 1. Perception of risk is the interpretation or judgment of risk or uncertain events, and their ultimate influence on human behavior. It is highly dependent on psychological features and characteristics (Nguyen et al., 2017; Ainia and Lutfi, 2019). It is the subjective assessment of a person's impression of the risk involved in a certain circumstance, event, activity, or technological advancement. When assessing the frequency of various risks, humans have the propensity to exaggerate minor frequencies and underestimate bigger ones. This is a key illustration of biased risk assessment. The psychometric paradigm, assuming that risk is psychologically determined, is a well-known method for investigating risk perception (Böhm and Tanner, 2018).

2.1 Availability Bias and Risk Perception Formulation

The term 'availability' classifies as a cognitive error where the incumbent retail investor seeks to process information in a distinct or particular way to reach conclusions while investing. (Toshino and Suto, 2004) The availability bias affects probability assessments depending on a person's ability to recall earlier instances of an event or their capacity to envisage an event occurring. The bias tends to occur when investors overestimate the occasional events and have a vivid representation of them in their memory when making decisions. There are two errors emanating from the availability heuristic: ease of recall and retrievability (Ritika and Kishor, 2020). As a result of this information processing error, responding investors assess risk and value solely based on availability perception. The factor 'perceived availability' has been viewed as shaping the impetus for risk perception development. Investors frequently end up mitigating the wrong risk because of incorrect risk perceptions. The investor's judgement is dependent on their unique and unpredictable life experiences. People with availability bias focus on the most recent risks and may be concerned about the incorrect ones (Siegrist and Árvai, 2020). Hence, the research proposes hypothesis H_1.

H_1: There is a significant relationship between perceived availability and risk perception formulation.

2.2 Herding Intent and Risk Perception Formulation

The herding bias paints a historical picture of retail investors' intent to blindly ape the footsteps of others in their social group, environment, or as influenced by media. It is a common form of conviction that an investor encounters while choosing between equities. It gauges an investor's willingness to mindlessly follow others without independent thought regarding the problem at hand or potential future profits. Herding is the propensity to follow friends, family, brokers, or advisors across various social platforms and make decisions in groups. The bias is the desire to act in accordance with what is customarily done while building a portfolio, allocating funds, or evaluating risk when making asset allocation decisions (Ton and Dao, 2014). When making decisions, the desire to naively imitate a group or to follow market leaders or the herd appears to weigh heavily. This herding behaviour owes to investors' low-risk propensity or risk-aversion as well as their desire to lower their risk of loss (Ahmed et al., 2022). They are hesitant to take on the risk of investing, or they simply do not know how to invest and rely on the advice or direction of others. Furthermore, investors face more herding behaviour in poorer areas where people perceive a higher risk due to a lack of investment (Huang et al., 2016). Herding consequently has an impact on investors' perception of risk and decision-making. The study pinpoints and hypothesises a link between the two factors.

H_2: There is a significant relationship between perceived herding and risk perception formulation.

2.3 Perceived Regret Aversion and Risk Perception Formulation

The regret aversion tendency among retail investors is identified as comprising the elements of loss regret undertaking or regret avoidance intent with regard to either loss of opportunity or loss of ability to benefit from a profit-making option (Wangzhou et al., 2021). This tendency of investors has been reported to frame and ascertain a course of action when they are faced with gross uncertainties. People are afraid of regret and avoid making decisions because they believe that any path they take will turn out to be less idyllic in the long run. In essence, this bias aims to prevent the regret that comes with making bad choices. Investors, for instance, are unnecessarily wary of entering financial markets that have recently produced losses due to regret aversion. Negative investing outcomes make them feel compelled to save money, withdraw, and nurse their wounds rather than continue and buy possibly cheap stocks (Qin, 2015). Investors, at times, postulate that they could have evaded an adverse outcome if a different sequence of action had been chosen while trading. What investors typically care about is the profit or gains that they could have comprehended in the past if they had accepted a different investment option. Such deviations from norms result in regret aversion biases, which alter risk perception (Ady and Hidayat, 2019; Weber, 2004). The studies show that the anticipation of regret stimulates behaviour choice and can endorse risk-averse or risk-seeking propensities. When individuals regret a choice, they either take more risks or refrain from taking risks in order to avoid the distress of regret in the future (Shah and Malik, 2021). Hence the research hypotheses in the following statement.

H_3: There is a significant relationship between perceived regret aversion and risk perception formulation.

2.4 Gambler's Fallacy and Risk Perception Formulation

The gambler's fallacy transpires when an individual has an inaccurate belief that the occurrence of a particular random event is more probable to happen or unfold in the future in a particular way, grounded on the result of a preceding event or sequence of events. This fallacy or myth is etiologically associated with gambling, where it is often believed that the

next roll of the dice is more likely to show a six since in recent throws the number of sixes has been lower than usual (Stöckl et al., 2015). People usually take up the notion that chance is a self-correcting procedure, where outcomes in one direction make the opposite outcome more likely to occur, ultimately leading to the restoration of equilibrium (Tversky and Kahneman, 1973). Investors frequently hold onto declining equities and sell rising ones. The steady increase in a stock's value may be seen by investors as a sign that it will soon fall, leading them to decide to sell. Similar to when a stock's value falls, this may be interpreted as a sign that it is about to rise, and thus investors choose to hold onto those stocks. Based on the history of similar previous events, investors make assessments of the possibility of a largely arbitrary occurrence, such as the stock price. Both are not necessarily associated (Shefrin and Statman, 1994). Gambling fallacies are thought to be etiologically related to the perception of risk, though with tenuous evidence (Spurrier et al., 2014). Investors have a predisposition to minimise risk during an upward trend because they want to maintain their prior earnings. Due to their belief that losses are more likely to occur in the future if profits were gained in earlier periods, investors will become more cautious and limit their investments as a result. On the other side, during a downturn, the bias develops since investors seem to be more risk-averse and assume that since some past periods produced losses, the likelihood of profits in the future will be high (Wijayanti et al., 2019). The paper tries to comprehensively identify the gambling fallacy bias amongst investors and examine its presence in determining an individual's investment risk perception. Hence, the research proposes this hypothesis:

H_4: There is a significant relationship between gambler and risk perception formulation.

2.5 Overconfidence and Risk Perception Formulation

The review of existing literature elaborates on the phenomenon of investor overconfidence, where the investor overtrades on account of his excessive belief in his capacity to understand markets, fetch a value, or preserve the value of the portfolio. The overconfidence flaw in decision-making often manifests as the most prevalent and most rampant bias in security market decisions (Ainia and Lutfi, 2019). This bias is defined as a vague or falsely elevated sense of confidence as a result of prior learning, skills, knowledge, or experiences, abilities, and capabilities that, in some way or another, lead to flawed risk assessment and the allocation of funds. The academic literature (Zahera and Bansal, 2018) has documented the excessive confidence among retail investors as evident in the form of overweighting certain aspects, ignorance of critical details, and overestimation of information from one peculiar source. Retail investors indulge in the provision of estimates for a given parameter that are different from the actual performance yardstick. (Broihanne et al., 2014) showed that overconfidence and optimism have a favourable impact on the risk that investors are ready to take, while risk perception has a negative impact. The subjective lack of probability drill, intent to start with extreme estimations (low and high), and tendency to circumvent central tendency anchors; often crystallise as an overconfidence exhibition in risk assessment (Costa et al., 2017). The flawed aggregation of outcomes and values seems to mould the risk perceived by the investors. Hence, the research proposes this hypothesis:

H_5: There is a significant relationship between overconfidence and risk perception formulation.

2.6 Anchoring and Risk Perception Formulation

The phenomenon of "anchoring" has been observed to involve the manner in which retail investors seek to evaluate the subjective probabilities of wealth maximisation and returns from investments by focusing excessively and unwisely on the first piece of advice or information, referred to as the "anchor" (Tversky and Kahneman, 1973). The subjects tend to anchor future prices with recent and contemporary observations. The estimate is based

on the preliminary initial value proposed in the investment problem statement. The initial value is then adjusted to yield the desired resultant value. Thus, anchoring bias leads to the resulting value being biassed toward the initial value, i.e., the prevalence of insufficient adjustment (Ritika and Kishor, 2020). Under mimetic pressures of information and a false sense of dependence on a piece of information, the retail investor often fails to devise a strategy to count the risk or the optimum allocation plan for the concerned financial resources (Costa et al., 2017). Ricciardi (2008) noted that when investors trust in an anchor value or look for possible anchor evidence, bias ensues, which in turn has an effect on the individual's perception of risk. This bias is further complicated by the fact that it is challenging to remove the anchor, even when people are aware they are doing so. Investors, whether intentionally or unintentionally, stick to their original opinions and can only modify their views by beginning with the same beliefs. Hence, the research proposes this hypothesis:

H_6: There is a significant relationship between anchoring and risk perception formulation.

2.7 ESG Consciousness and Risk Perception Formulation

Most ESG literature examines the performance of sustainable investments on the financial performance of the portfolio. However, the linkage between ESG Consciousness and risk perception formulation has not been much explored in the yesteryear research works. The evolving ESG embedment across retail investors seeks to shape up the impetus for the biased risk perception as the ESG values often lead to one-sided or selective risk assessment (Briehl, 2022; Tomo and Landi, 2017). The partaking of retail investors in the equity market is increasing. Of all the information available to the investor for building his perception, one important piece of information is the EGSness of the company i.e., information regarding environmental safety, corporate integrities, employee relationships, etc. The information concurrently helps investors to better perceive risks related to their investment decisions. ESG investment decisions are stimulating investors to take up ethical investment practices, and also changing their perspective on the risk-return analysis for their portfolio, thereby influencing their risk perception (Park and Oh, 2022). Boffo and Patalano (2020) noted ESG ratings to be a broader tool that serves diverse purposes for diverse investors. Some investors use ESG as a tool for risk management. Hence the research tries to bring the risk perception view into the ESG consciousness of investors, and thereby proposes this hypothesis:

H_7: There is a significant relationship between ESG Consciousness and risk perception formulation.

2.8 Risk Perception Formulation and Investment Decision Making

"Risk Perception" shows how investors consider the risk related to financial assets based on their emotions and experiences. Subjective behaviors that are impacted by external factors seem to reflect risk perception (Weber, 2004). Risk and uncertainty are connected ideas that determine how intense of a risk investor perceives. When making investments or building projects, policymakers and investors work to reduce risk. Inexperienced investors naturally perceive risk more inaccurately than investors with extensive understanding of the financial market (Nguyen et al., 2017). All investors view risk differently because different decisions are influenced by investors' diverse portfolios, and because investors' perception of risk is influenced by their beliefs, opinions, and judgements. Thus, an investor's propensity to take risks is influenced by how they perceive risk (Wangzhou et al., 2021). Hence the research proposes this hypothesis:

H_8: There is a significant relationship between risk perception formulation and investment decision making.

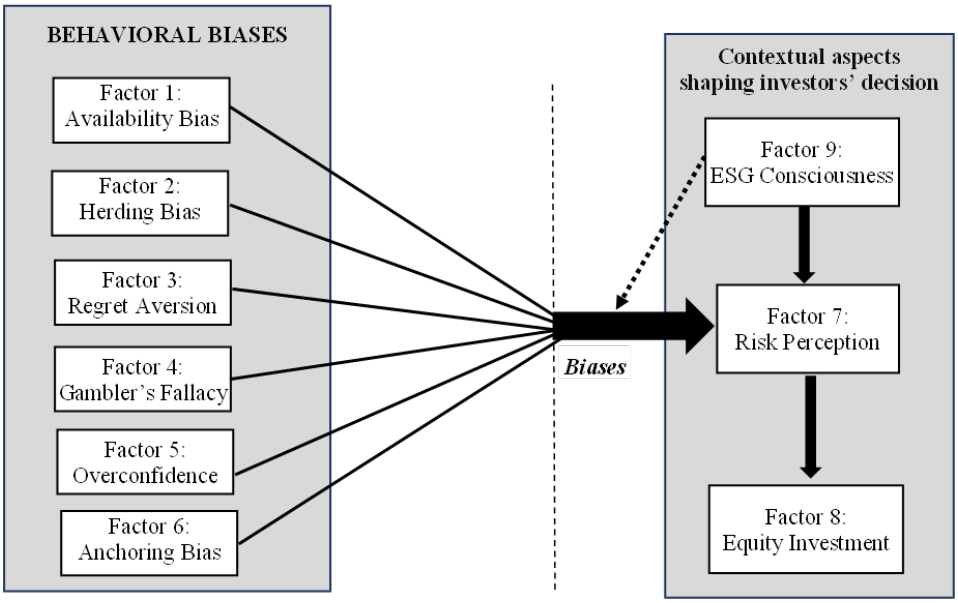

Fig. 1: Tentative mapping of factors across the hypothetic model

3 METHODOLOGY

3.1 Scaling Instrumentation

The constructs of the proposed study are sought to be operationalized with aid of facilitators namely the behavioral biases: "availability", "herding", "aversion", "gamblers' fallacy", "overconfidence", "anchoring"; "ESG Consciousness"; "risk perception" and "investment decision". They form the latent variables of the study. The study seeks to leverage the 5-point Likert scale for the collection of data through a structured questionnaire considered in line with the work of (Ajzen and Fishbein, 1980). The questionnaire was divided into parts of investors' profiles (demographics) and then statements with 5 Likert-based options ranging from 1 for "strongly disagree"; to 5 for "strong agree". Tab. 2 lists the items included in the questionnaire. The items included in the questionnaire were adopted from various previous research works with partial modification, and a few were created by the researcher as per the requirement of the proposed study.

3.2 Sampling

The study is based on the perceptions of Indian investors in the stock markets in aftermath of the COVID pandemic. Random samples of 438 investors (above 18 years) were asked to fill up the questionnaire. This is at par with the reference of Hair et al. (2006) which recommends a sample size of not less than 200. The random sampling method ensured covering the entire geographical zones and diverse cultures of the Indian investing population. The research attracted 259 males and 179 females. A brief snapshot of the investors' profile is illustrated in Tab. 1.

3.3 Research Tools

Dimensional validity assessment for scale items with extractive and confirmatory factor analysis is considered a prerequisite to SEM modelling and hypothetical research model attainment (Anderson and Gerbing, 1988). The research used "factor analysis" methodology to investigate the scopes of the factors considered for the study. The Exploratory Factor Analysis

Tab. 1: Investor's profile (Age, Gender, Experience, Qualification and Income), $n = 438$

Variable		Male	Female	Total
Age of Investors	18–30 years	66	61	127
	31–45 years	82	63	145
	46–60 years	70	39	109
	60 years and above	41	16	57
Experience in Equity Market	< 1 year	52	40	92
	1–3 years	86	71	157
	3–5 years	64	39	103
	Above 5 years	57	29	86

Variable		Total	Variable		Total
Annual Income (in Rs. Millions)	Less than 0.5M	39	Qualification of Investors	Class X	30
	0.5–1M	137		Class XII	74
	1–2M	117		Graduate	214
	2–3M	96		Post-Graduate	92
	Above 3M	49		Higher or any other professional degree	28

(EFA) enables the estimation of the dimensions and leads to a dimensional validity assessment with regard to the collected data (Gosselin et al., 2008). In view of the research objective, the "KMO Test" (for data suitability), "EFA" (for identifying and defining latent constructs), and "Reliability Assessment" with "Cronbach Alpha" were used in the study. SPSS was leveraged to calculate the variance with oblimin rotation in the PCA method (principal component analysis). EFA was observed to lead to the subsequent reduction of the subscale items. PCA was used to validate the loading of the subscale items and to determine factor structure (Hoyle, 1995). The research relies on "Confirmatory Factor Analysis" (CFA) for understanding the factor structure, validity, and reliability of the latent variables of the study. The AMOS-based "Structural Equation Modeling" (SEM) was used for the establishment of path analysis and structural causal relationships amongst the variables. SEM is relevant for mapping cross-factor relationships. It is a multivariate tool for estimating path-based relationships across factors (Hair et al., 2006; Hoyle, 1995).

3.3.1 Factorability Assessment

The Kaiser-Meyer-Olkin (KMO) measurement was 0.896, which falls within the acceptable range of 0.7 to 0.99 (Vogt and Johnson, 2015). In essence, this signifies the appropriateness of using factor analysis on the data gathered regarding the model's contributing factors. In ideal terms, KMO measures the amount of variance among the variables used in the study. The "Bartlett Test" of data sphericity showed a p-value of 0.000 (< 0.05), which indicates that statistically significant variance is present across the collected data. The significant p-value indicates that the data is significantly suitable for factor analysis. Consequently, the study's data set is normal, and the sample size is enough (Williams et al., 2010).

3.3.2 Factor Extraction and Dimensional Validity

To determine the weighted average that each component holds across the scale composition, factor extraction is crucial. The factors for the study are extracted using PCA and varimax rotation. All factor loadings greater than 0.5 were retained and considered for further analysis (Roesch and Rowley, 2005). Furthermore, the variance examination reveals the factor-bound weights, as shown in Tab. 2. Literature suggests that variables with eigenvalues greater than 1 are taken into account for the purpose of factor extraction. The factors in the study explain approximately 69% of

Tab. 2: Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1 = Overconfidence	11.051	19.735	19.735	6.816	12.172	12.172
2 = Risk	6.748	12.051	31.786	5.264	9.400	21.572
3 = Anchoring	4.524	8.079	39.865	5.082	9.074	30.646
4 = Herding	3.809	6.802	46.667	4.112	7.343	37.990
5 = Investment	3.587	6.405	53.071	4.036	7.206	45.196
6 = Aversion	2.966	5.297	58.368	3.850	6.874	52.070
7 = Availability	2.400	4.286	62.655	3.592	6.414	58.484
8 = ESG	2.127	3.799	66.453	3.570	6.375	64.859
9 = Gambler	1.555	2.777	69.230	2.448	4.371	69.230

Note: Extraction Method: Principal Component Analysis

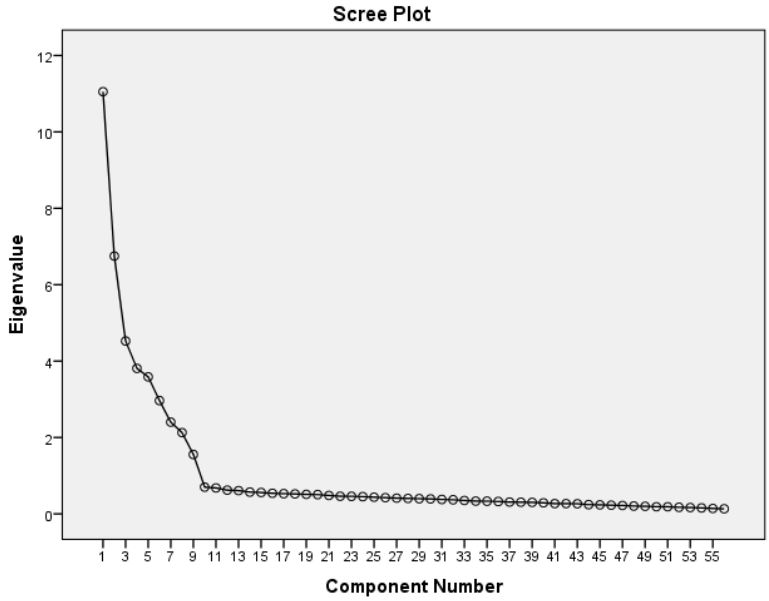

Fig. 2: Scree plot for the selected Factors

the total cumulative variance. Additionally, a graphical method called a scree plot (Fig. 2) is used to access the factor extraction. It maps the variance of the considered factors and illustrates the Eigen values on the y-axis and the number of factors on the x-axis, respectively The downward curve slopes to the right, and the number of factors considered for the study is to be classified from the slope to the elbow point (Ledesma et al., 2015). For extracting interpretable factors, Varimax rotation, also known as Kaiser-Varimax rotation or Kaiser Normalization, was used. The factors with higher loadings are identified and labelled for each component (Weide and Beauducel, 2019).

3.3.3 Discriminant & Convergent Validity of the Model, CFA Model Fit

The loadings of the sub-scale dimensions that indicate the research's incorporated factors are shown in Tab. 3. The table indicates the factor strength and respective AVE ("average variance explained"), CR ("composite reliability"), and MSV ("maximum shared variance") measures, which are all in the acceptable range. The factor

Tab. 3: Discriminant and convergent validity measures (AMOS, SPSS)

Sub Scale Statements		Factor Loadings	CR	AVE	MSV	Alpha
Factor: Perceived Availability						
Source scale: Ritika and Kishor (2020); Siraji (2021); Salman et al. (2021); Hunguru et al. (2020)						
AV1	"I usually make an investment decision in these stocks that have more information available to me"	0.777	0.904	0.654	0.224	0.902
AV2	"When I invest in a certain company, then I relay information provided by brokers and friends"	0.813				
AV3	"I prefer to invest in well-known companies that have wider media coverage"	0.819				
AV4	"I consider the recent records of a security before investing"	0.792				
AV6	"While considering the track record of an investment, I put more weight on its recent performance"	0.794				
Factor: Perceived Herding						
Source scale: Raut and Kumar (2018); Ton and Dao (2014)						
HE1	"Before purchasing stocks, consultation with others (family, friends, or colleagues) is required"	0.832	0.889	0.616	0.101	0.890
HE2	"Information about transactions of foreign investors helps me in taking my portfolio decisions"	0.789				
HE4	"The best way to protect wealth is to do as others do in the share market"	0.822				
HE6	"Other investors' decisions of buying and selling of particular stocks have an impact on my investment decision"	0.779				
HE7	"Other investor's decision regarding the stock volume has an impact on my investment decision"	0.798				
Factor: ESG Consciousness						
Source scale: Inderst et al. (2012); self-developed questions						
ESG1	"I wish to invest in companies that care about the risk of climate change issues like global warming, the greenhouse effect"	0.786	0.895	0.635	0.205	0.801
ESG2	"I'm willing to share something with others without expecting anything direct and immediate in return"	0.791				
ESG3	"I wish to invest in companies that care about workplace health and the safety of the employees"	0.790				
ESG4	"I wish to invest in companies that care about the independence and accountability of board members"	0.771				
ESG6	"Companies should take responsibility for the planet and society"	0.763				
Factor: Gambler's Fallacy						
Source scale: Waweru et al. (2008); self-developed questions						
GA1	"I consider the continual rise of a stock's value as an indication that it will soon crash"	0.846	0.840	0.568	0.112	0.802
GA2	"I am normally able to anticipate the end of good or poor market returns in the stock market"	0.865				
GA4	"I avoid selling shares that have decreased in value as this is an indication that it is due for appreciation in the future"	0.858				

Sub Scale Statements		Factor Loadings	CR	AVE	MSV	Alpha
Factor: Regret Aversion *Source scale: Ritika and Kishor (2020); Baker et al. (2018)*						
AVS1	"When it comes to investment, no loss of capital (invested money) is more important than returns/profits"	0.769	0.920	0.694	0.040	0.928
AVS2	"I will not increase my investment when the market performance is poor"	0.806				
AVS3	"Holding loss-making investments for a longer time is more painful than disposing of profitable investments early"	0.770				
AVS4	"I avoid investing in profitable assets if I had incurred losses in similar investments in the past"	0.724				
Factor: Overconfidence *Source scale: Ritika and Kishor (2020); Metawa et al. (2018)*						
OC1	"I am aware of almost every major event in the share market"	0.870	0.934	0.746	0.129	0.849
OC2	"I am confident in my ability to make investment decisions better than others"	0.850				
OC3	"I keep the best stocks in my portfolio"	0.815				
OC4	"I trust my intuitions while making investment decisions"	0.840				
OC6	"I always feel optimistic about the future returns of my investments"	0.867				
Factor: Anchoring *Source scale: Hunguru et al. (2020); Shah et al. (2018)*						
ANH1	"I compare the current stock prices with their recent high and low prices to justify my stock purchase"	0.718	0.886	0.556	0.226	0.730
ANH2	"I use the stock purchase price as a reference point for trade"	0.747				
ANH3	"If a stock hits its year high, I will sell the stock immediately"	0.752				
ANH4	"I usually use the purchase price as a benchmark for a sell decision"	0.736				
Factor: Equity Investment Decision *Source scale: Shockey (2002); Mayfield et al. (2008); self-developed questions*						
INV1	"I would like continuing buying and selling shares in the stock market/exchange for the next few years"	0.827	0.897	0.634	0.204	0.831
INV3	"I prefer to invest in the stock exchange to other parallel markets such as housing, gold, currency, and so on"	0.813				
INV4	"Even in the case of temporary fluctuations in the stock market, I will not leave the market"	0.778				
INV6	"I often keep booking profits gained in the share market"	0.766				
INV7	"I would invest a larger sum of money in the stock"	0.784				
INV8	"I am a good observer of movements in stocks"	0.786				

Sub Scale Statements		Factor Loadings	CR	AVE	MSV	Alpha
Factor: Risk Perception						
Source scale: Grima et al. (2021); Shah et al. (2018); Sindhu and Kumar (2014)						
PR1	"As a person, I am open-minded, curious, open to new ideas, and creative"	0.777	0.906	0.656	0.227	0.802
PR2	"Any risk events that I experienced in my life had an effect on my current behavior and attitude toward those risks"	0.787				
PR4	"The more I know about risks the more I feel I have more control over the risks"	0.748				
PR6	"The higher an investment's yield or rate of return, the greater its associated risk"	0.801				
PR7	"The more familiar an investment, the less risky it is"	0.798				
PR9	"An investment that involves a great deal of risk is not really an investment but it is gambling"	0.808				
PR11	"The need to liquidate quickly prohibits me from considering riskier products"	0.813				
PR12	"I prefer to remain with an investment strategy that has known problems rather than take the risk of trying a new investment strategy that has unknown problems, even if the new investment strategy has great returns"	0.733				

loadings adjacent to the column of items in Tab. 3 represent the dimensional validity. The factor loadings range from a high of 0.87 for item statement "OC1" to a low of 0.718 for item statement "ANH1." Since every reported result is greater than 0.7, the significant reliability is confirmed (Kiliç et al., 2020). The value of each latent variable's Cronbach's α in the table is significantly above 0.70, the literature-recommended floor level, indicating composite reliability for the study (Chang and Zhu, 2020). The CR values vary from 0.84 to 0.93 and are securely above the suggested standard of being above 0.6. The AVE scores also satisfy the standardised recommendation of being greater than 0.5. Moreover, all nine constructs meet the criterion that the CR value must be greater than the AVE value. Thus, statistically, the constructs of the research work ensure convergent validity. All AVE values reported in the table are greater than 0.5 and above the MSV value, thereby confirming the discriminant validity of the study (Hair et al., 2006).

Confirmatory factor analysis was done to evaluate the measurement model's structural validity. Good model fit indices were shown by the CFA measure, which had the following values: χ^2 / df = 2.8, CFI = 0.95, GFI = 0.94, AGFI = 0.90, NFI = 0.93, and RMSEA = 0.03. The values are all well above the recommended benchmarks (Hair et al., 2006).

4 ANALYSIS & RESULTS

The assessment of structural linkages between the latent variables is considered crucial to determining the validity of the presumptive hypothesis and the appropriate evaluation of the cross-factor influence. The study of structural relationships among the relevant factors was carried out using the AMOS software. Fig. 3 shows the model validation of the selected biases for the study. The results showed that subconstructs: "availability bias", "gambler's

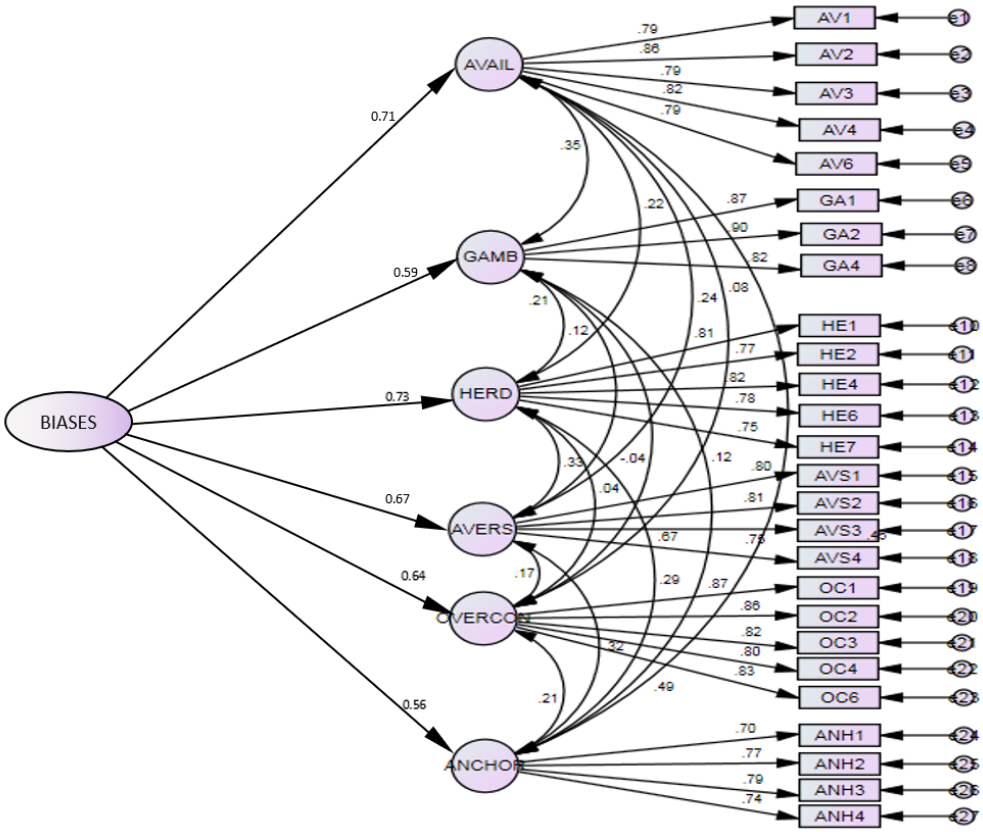

Fig. 3: Biases Model Validation (AMOS)

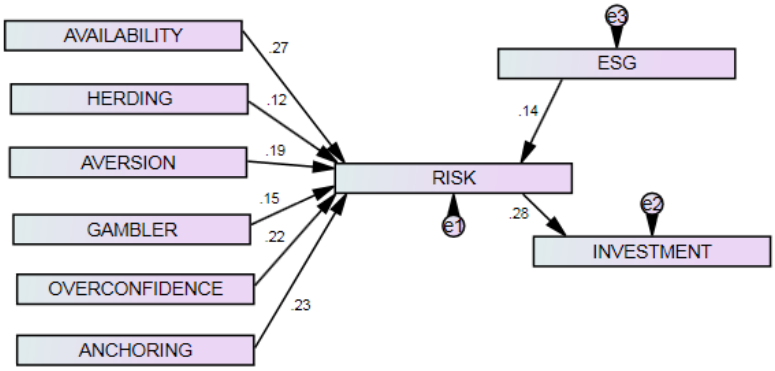

Fig. 4: Structural impact modeling (AMOS)

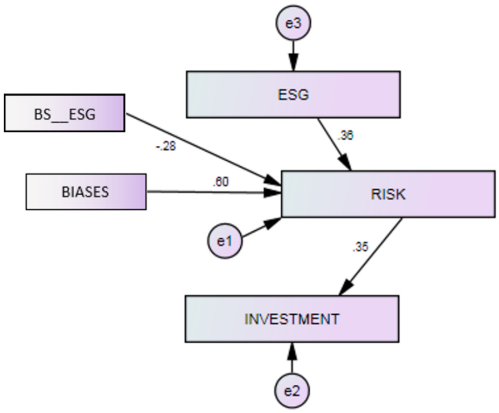

Fig. 5: Aggregate impact modelling with moderation emphasis of ESG (AMOS)

fallacy", "herding bias", "aversion bias", "overconfidence", and "anchoring bias" load properly on to the construct: "behavioral biases".

SEM modelling platform was used to accomplish the causal and path-based hypothesis testing, depicted in Fig. 4. The calculations revealed the incidence of "availability bias", "gambler's fallacy", "herding bias", "aversion bias", "overconfidence", and "anchoring bias" as exerting a considerable and statistically significant impact on risk perception, which further impacts the equity investment undertakings. Also, ESG consciousness is seen to be statistically related to the risk perception of the investors. The CR (critical ratio) in AMOS is the most observed basis for examination of the statistical significance of the structural equation modelling calculations. The most acceptable values for CR are ± 2.58. This establishes statistical significance at $p < 0.01$ levels of estimation. It is found that there is significant relationship across the construct of availability bias and risk perception (standardized estimates = 0.270, CR = 4.053). Hence H_1 stands vindicated. Also, the construct of herding was observed to lead to a significant impact in sense of risk perception (standardized estimates = 0.120, CR = 3.934). Hence H_2 stands vindicated. The research also observed that there is significant relationship across the construct of aversion bias and risk perception (standardized estimates = 0.190, CR = 4.789). Hence H_3 stands vindicated. In association, the construct of the gamblers' fallacy was observed to lead to a significant change in risk perception (standardized estimates = 0.150, CR = 2.82). Hence H_4 stands vindicated. The research also observed that there is a significant relationship between overconfidence bias and perceived risk of investors (standardized estimates = 0.220, CR = 4.095). Hence H_5 stands accepted. Likewise, hypothesis H_6 (standardized estimates = 0.230, CR = 4.039) stands accepted, implying that a statistically significant impact of anchoring tendencies on risk perception is seen among investors. Hypothesis H_7 stating that ESG consciousness and risk perceptions exhibited a statistically significant relationship is accepted (standardized estimates = 0.140, CR = 4.059). Similarly, risk perceptions and investment undertaking bear a statistically significant relation, thereby validating hypothesis H_8 (standardized estimates = 0.280, CR = 4.021). Further, the structural equation model in Amos shows that ESG consciousness work as a factor influencing risk perception, as well as a moderator between the perceived biases of investors and their risk perception (Fig. 5).

For examining the impact of ESG consciousness as the moderator between biases and risk perception, the interaction procedure is used (Hair et al., 2006). Interaction variables are created in SPSS by calculating the product of the independent and the moderator variable. First of all, the independent variable "Biases" and the moderating variable: ESG

Consciousness were standardized, and then the interaction term (BS_ESG) was calculated. The moderation was tested in AMOS by constructing a structured diagram. The path estimates are all statistically significant as calculated in Fig. 5 and Tab. 4. The aggregate 'biases' were observed as having a direct relationship with risk perception, whereas the interaction term exhibited a considerable negative moderation impact of 0.28 times. This shows that ESG investing consciousness negatively moderated the relationship between Biases and Risk perception. It shows that higher ESG consciousness weakens the positive relationship between investors' perceived biases and Risk perception.

Tab. 4: Moderating SEM outcomes

Path based relationships		Estimate
RISK	← BIASES	0.597***
RISK	← ESG	0.358***
RISK	← BS_ESG	−0.284**
INVESTMENT	← RISK	0.355***

Notes: *** signifies 1% level of significance; ** signifies 5% level of significance

5 DISCUSSION AND CONCLUSIONS

Irrationalities in financial decision-making and the further interaction between behavioural biases, risk perception and ESG investing consciousness is the core subject of this study. Though traditional finance calls for perfectionism and rationality in financial decision-making, yet the actual decision-making is always full of irrationality, abrasions, and deviations from the suggested and opinioned course of action. The results as observed echo the findings of earlier studies that vindicated that the human psyche has always been prone to deviations, distractions, and imbalance (Ady and Hidayat, 2019; Kahneman, 2013; Lazuarni and Asri, 2019; Hunguru et al., 2020).

The study, in line with other research works of Wangzhou et al. (2021), Weber (2004), Nguyen and Rozsa (2019) confirms that risk perception significantly impacts the equity investment decisions of investors and establishes significant link between the selected biases of the study and the perceived risk towards equity investment decisions. Forlani and Mullins (2000) examined perceived risk and found significant links with behavioral biases. Houghton et al. (2016) also concluded that risk perception mediated the relationship between cognitive biases and the decision to start a venture. Zhang et al. (2022) confirmed the mediation role of risk perception between cognitive biases on investment decisions. The study establishes that Availability bias has a significant effect on perceived risk on investments which is similar to the finding of Toshino and Suto (2004). Investors use mental shortcuts that relies on immediate examples that come to a given person's mind when undertaking decisions. Siegrist and Árvai (2020) too pointed out that people with availability bias are looking at the most recent risks. and might worry about the wrong risks. The study has also statistically vindicated that Herding behavior has an impact on investors' perception of risk and decision-making. Previous works like Huang et al. (2016), Ahmed et al. (2022) too pointed out that the major reason for herding behavior is low-risk propensity or risk avoidance of investors, and their want to minimize the risk of loss. Investors do not want to take the risk of investment and so follow the opinion/directions of others to have investment safety. The regret aversion tendency among retail investors is impacting the risk perception of investors, with statistical significance. The studies (Ady and Hidayat, 2019; Weber, 2004; Shah and Malik, 2021) too show that the anticipation of regret stimuluses behavior choice and can endorse risk-averse or risk-seeking propensities. When people regret a decision, either they take more risks, or they compel from risk, in order to prevent the pain of regret in the future. The research also confirms that gambler's fallacy transpires into investors equity decisions and their risk perception. Investors frequently keep holding onto declining equities and sell rising ones. They believe that outcomes in one direction make

the outcome in the contradictory direction more likely to occur, ultimately leading to the restoration of the equilibrium (Tversky and Kahneman, 1973). The fallacy has not much been discussed in yesteryear researches. Spurrier et al. (2014) pointed gambling fallacies to be etiologically related to the perception of risk, however with tenuous evidence. Wijayanti et al., (2019) concluded that the bias occurs during an uptrend because investors tend to avoid risk and during a downtrend because investors will be more risk-seekers. As elaborated by the existing literature of Ainia and Lutfi (2019) or Zahera and Bansal (2018), the phenomenon of investor's overconfidence is seen significantly to impact investors' perceived risk and their equity decisions. Ishfaq et al. (2017) mentioned the mediative role of risk perception between overconfidence and investment decisions. Broihanne et al. (2014) carried out the study in context of finance professionals, and found similar results of overconfidence and optimism influenced by risk perception. The phenomenon of "anchoring" bias has also been observed to be significantly related to the risk perceived by investors. This is again in line with literatures of Tversky and Kahneman (1973), Ritika and Kishor (2020), Costa et al. (2017), whereby evidences are seen that investors seek to evaluate the probabilities of wealth maximization and returns from the investments by extensive and unwise focus or reliance on only the first piece of advice or information, known as the 'anchor'. Zhang et al. (2022) provided evidences of relationship of anchoring bias through risk perception with investment decision undertaking.

The study here discusses the Indian perspective of the relevance of ESG investing consciousness, its relationship with the way risk is perceived by investors, and further its moderation impact on the relationship between the behavioural biases and the corresponding risk perception of equity investors. The findings indicate a statistically significant relationship between ESG consciousness and risk perception of investors. This aligns with the findings of a few limited studies in the same context which predicts that ESG investment decisions are stimulating investors to take up ethical investment practices, and also changing their perspective on the risk-return analysis (Park and Oh, 2022; Statman, 2020; Friede, 2019; Coulter and Malmqvist, 2021). Boffo and Patalano (2020) noted ESG ratings as a broader instrument serving investors as a tool for risk management. Yu et al. (2021) in their research work attributed that non-financial factors such as ESG plays a part in shaping how investors perceive the riskiness factor. When investors search for additional environmental information, there is a reduction in information asymmetry which can further lower investors' perceived risk for their investment undertaken. The current study also observed that ESG choices alter the way identifiable investors' biases can affect their perceived risk of investors. Empirical results show statistically significant negative moderation effect of ESG consciousness on the relationship between the selected biases for the study and investors' perceived risk. This indicates that higher ESG consciousness weakens the positive relationship between investors' perceived biases and Risk perception. Briehl (2022) pointed out that numerous individual characteristics contribute to the difference in behaviors between ESG conscious investors and conventional investors. According to Rosen et al. (1991), ESG investors are more educated and younger than ordinary investors and the general public, making them less likely to harbor biases. Similar to this, Tippet and Leung (2009) discovered that ethical investors in Australia are primarily women, who tend to be younger and better educated than conventional investors, but who also tend to have smaller, less diversified portfolios. Statman (2020) also pointed out that "plow-minded" investors, in return for emotional benefits, are prepared to sacrifice the utilitarian benefits of their portfolio returns, while, "banners-minded" investors are unwilling to sacrifice any utilitarian returns, in exchange for emotional benefits. Thus, ESG investing decisions reflects the behavioural aspects of the investors in various research works. The current study also observed that ESG choices often alter the way identifiable investors' biases can affect their perceived risk for equity investments.

6 LIMITATIONS AND FURTHER SCOPE

The research experienced limitations in terms of approach and selection of factors and variables for the study. For building the theoretical framework, the research relied only on the existing literature and the publications that surfaced with keyword searches. The choice of behavioral factors for the study could be a limitation in itself. Although the current research is based on a pan-national perspective, it suffers from limitations in terms of the time focus. The study was time bound yet a longitudinal perspective could have yielded better results and enabled mapping of influences over a larger time frame. Further research could be conducted for the other behavioral biases prospects observed across the retail investor. Also, the role of digital media and other external factors in shaping investors' cognitions for ESG investing leaves a further scope for research.

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