Impact of Demographic Factors on Behavioural Biases: An Empirical Study

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ABSTRACT

This study examines the influence of demographic factors on behavioural biases among retail investors, with a focus on heuristics and prospect theory constructs. The research addresses a critical gap in existing literature, which often isolates these biases rather than exploring their interrelationship. The study aims to identify the most prominent behavioural biases and to assess the extent to which demographic variables impact susceptibility to these biases. Data were collected from 171 retail investors in the Dakshina Kannada district, Karnataka, India, through a structured questionnaire. The analysis involved descriptive statistics, multivariate analysis of variance, and structural equation modelling. Findings reveal that gender significantly influences prospect theory-related and overall behavioural biases, while other demographic factors show limited impact. Among the heuristic biases, self-attribution and recency bias emerged as the most influential, whereas the disposition effect was dominant under prospect theory. A strong positive correlation was found between heuristic and prospect theory constructs, indicating that cognitive and emotional biases are interconnected in shaping investment behaviour. The study highlights the need for targeted investor education and financial literacy programs, suggesting that policy interventions should consider behavioural patterns to promote rational decision-making in financial markets.

Keywords: Behavioural Bias, Heuristics, Investment Decisions, Prospect Theory, Retail Investors

INTRODUCTION

Retail investors often deviate from rational financial decision-making due to the influence of behavioural biases, cognitive and emotional distortions that affect how information is processed and acted upon. While traditional finance theories assume investor rationality, the behavioural finance paradigm justifies that individual frequently rely on heuristics and exhibit predictable patterns of judgement under uncertainty, particularly in dynamic and uncertain markets. These behavioural tendencies become more pronounced in emerging economies, where access to financial education and structured investment frameworks may be limited. Among the numerous factors shaping investor behaviour, demographic characteristics such as gender, education, occupation, income, and prior exposure to financial knowledge are believed to moderate susceptibility to such biases, yet empirical findings on their significance remain inconclusive.

A noteworthy gap in current literature lies in the classified treatment of behavioural biases, most studies focus on individual biases separately rather than exploring their interrelationships. Specifically, less research is conducted on how heuristic-driven biases (such as recency and self-attribution) interact with prospect theory-based constructs (like the disposition effect and regret aversion) within a unified analytical model. This lack of integrated examination restricts a holistic understanding of how retail investors make decisions when faced with risk and uncertainty.

This study addresses that gap by empirically investigating the combined influence of heuristics and prospect-related behavioural biases, while simultaneously evaluating the role of demographic factors in shaping susceptibility to these biases. Using structural equation modelling (SEM), the research identifies dominant behavioural patterns and tests the interrelationship between the two bias categories. The novelty of this work

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lies in its dual-layered approach: it not only quantifies the link between demographic traits and behavioural biases, but also uncovers the strong correlation between heuristic and prospect theory constructs, an area often overlooked in previous studies.

The paper is structured as follows: Section 2 presents a review of relevant literature, highlighting existing findings and identifying gaps. Section 3 describes the research methodology, including sampling design and analytical techniques. Section 4 discusses the results of the study, followed by key findings. Finally, Section 5 concludes the study and outlines the managerial implications of the research.

LITERATURE REVIEW

The field of behavioural finance increasingly acknowledges that retail investment decisions are often driven not by rational analysis but by a complex interplay of cognitive biases, emotional tendencies, personality traits, and perceived risk. A growing body of literature confirms that these psychological factors vary significantly across investor profiles and market environments.

Multiple studies emphasize overconfidence as a recurring cognitive bias influencing investor behaviour. Shunmugasundaram & Sinha, (2024) highlight its role in mediating the relationship between behavioural tendencies and investment outcomes, especially when combined with the disposition effect, revealing a cognitive-emotional loop in decision-making. This cognitive pathway is supported by Bihari et al., (2023)who identified regret and loss aversion as co-occurring biases, expanding the analysis to include emotional influences. The interdependence of cognitive biases and personality traits is further explored by Loebiantoro et al., (2025), who link biases like availability and the disposition effect to openness, extraversion, and agreeableness. This suggests that biases are not isolated mental shortcuts but are embedded in psychological makeup. Similarly, Chaudhary et al., (2025) identify risk perception as a pivotal mediator between heuristic biases—such as overconfidence, anchoring, and representativeness—and investment decisions, implying that personal interpretation of risk acts as a cognitive filter, shaping how biases influence behaviour.

Arora & Rajendran, (2023) explored two well-documented biases—the disposition effect and anchoring bias—among Indian investors under varying market conditions. Their quasi-experimental study showed that the disposition bias is more pronounced in volatile markets**,** while anchoring bias was more significant in stable market conditions. However, these behavioural dynamics are not consistent across all markets. Yuana et al., (2024), examining Indonesian investors, found overconfidence and optimism bias to be dominant, whereas herding was not statistically significant. In developed markets, such as China, Shahzad et al., (2024) found consistent and significant influence of the five ORAAH biases (Overconfidence, Representativeness, Availability, Anchoring, and Herding) across several stock exchanges. This uniformity suggests a structural robustness of behavioural biases even where market efficiency is presumed to be high. In contrast, Gurung et al., (2024) studying investors in Nepal, an emerging market, found overconfidence, anchoring, and regret aversion to be impactful, while representativeness and herding had weaker effects.

In frontier markets like Bangladesh, studies by Hossain & Siddiqua, (2022) and Yasmin & Ferdaous, (2023) emphasized emotional biases especially risk aversion, regret aversion, and cognitive dissonance as dominant factors influencing irrational decisions. These findings demonstrate that emotional volatility and cognitive conflict play a larger role in less developed financial environments, where institutional safeguards and investor sophistication are often lacking. Srinivasan & Karthikeyan, (2023) explore the role of self-efficacy on stock market decisions. Their findings interconnect with the broader literature by showing that heuristics, grounded in personal judgment and experience, positively relate to behavioural biases, while prospect theory and herding are less influential. Self-efficacy, moderates the impact of these biases, yet fails to eliminate irrational behaviour entirely.

Keller & Pastusiak, (2016) studied the influence of stock recommendation reports on investor behaviour in the Polish stock market, revealing that such reports often introduce heuristic-based decision making rather than rational evaluation. The study found that ambiguity in recommendations can mislead investors, especially around publication dates, reinforcing heuristic-driven biases and weakening the quality of investment decisions. Their research contributes to understanding how external information sources can trigger biases,

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reducing market efficiency. Khilar & Singh, (2019) studied the behavioural biases of retail investors in Bhubaneswar, India**,** aiming to identify which biases most affect investment decisions. They highlighted the impact of demographic factors such as gender, age, income, and occupation in shaping investor preferences and susceptibility to biases. Their results emphasized that behavioural anomalies are widespread, and that biases play an important role in investment decisions, reinforcing findings from other studies like Arora & Rajendran, (2023).

Also focusing on India, Madaan & Singh, (2019)evaluated four prominent biases namely; overconfidence, herding, anchoring and disposition effect, and found that overconfidence and herding significantly impact investment decisions. Ullah et al., (2020) studied the disposition effect, herding, and overconfidence among small investors in Pakistan. While overconfidence and herding were strongly influenced by investor type, the disposition effect showed no significant moderation by investor type**,** indicating its consistent impact across different investor categories. Additionally, a study conducted at Indonesia, Murhadi et al., (2024) found that the disposition effect is not significantly influenced by any demographic variables**.** Mushinada & Veluri, (2019) empirically demonstrated that self-attribution and overconfidence biases coexist with rational investor behaviour. The study revealed a significant positive co-relation between self-attribution and overconfidence, where increases in one lead to increases in the other. Additionally, investor characteristics such as gender, age, income, and experience were shown to influence susceptibility to these biases.

Research Gap and Hypotheses Development

Although behavioural finance research has made significant efforts in examining the influence of various biases on investor behaviour, notable gaps remain. One key limitation is the tendency of prior studies to analyse behavioural biases in isolation, often focusing on individual constructs such as overconfidence or herding, without considering the broader interrelationship between heuristics-based and prospect theory-based biases. This fragmented approach overlooks the potential structural linkage and combined influence of these two categories of approach on decision-making. The present study addresses this gap by empirically validating their interconnectedness using structural equation modelling, thereby offering a more integrated understanding of how these cognitive and emotional factors jointly shape investor behaviour. To meet this gap, the following objectives are set and hypotheses developed.

Objectives

1. To identify the prominent behavioural biases among retail investors

2. To assess the relationship between demographic factors and susceptibility to behavioural biases.

Hypotheses

1. Gender Differences

H_{01}: There is no significant difference in Heuristics biases between male and female investors.

H_{02}: There is no significant difference in Prospect theory-related biases between male and female investors.

H_{03}**:** There is no significant difference in overall behavioural biases between male and female investors.

2. Educational Background

H_{04}: Education do not significantly influence Heuristics biases.

H_{05}: Education do not significantly influence Prospect theory-related biases.

H_{06}: Education do not significantly influence overall behavioural biases.

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3. Occupation

H_{07}: Occupation do not significantly influence Heuristics biases.

H_{08}: Occupation do not significantly influence Prospect theory-related biases.

H_{09}: Occupation do not significantly influence overall behavioural biases.

4. Annual Income

H_{10}: Income do not significantly influence Heuristics biases.

H_{11}: Income do not significantly influence Prospect theory-related biases.

H_{12}: Income do not significantly influence overall behavioural biases.

5. Prior Knowledge about Stock Market

H_{13}: Prior stock market knowledge do not significantly influence Heuristics biases.

H_{14}: Prior stock market knowledge do not significantly influence Prospect theory-related biases.

H_{15}: Prior stock market knowledge do not significantly influence overall behavioural biases.

RESEARCH METHODOLOGY

The study uses research approach of quantitative research, using primary data via a structured questionnaire directed at individual retail investors. Purposive sampling was applied to ensure that only individuals involved in the investment in equity stocks would participate in the study. The targeted population were clients of various financial advisory services in Dakshina Kannada District, Karnataka and included respondents from different generations namely, Baby Boomers through Generation Z. A sample size of 250 was identified and questionnaires were distributed using google forms. However only 171 responses were collected and used for the study. The questionnaire was designed in two sections:

Section I gathered demographic information, including gender, annual income, educational qualification, occupation**,** and prior knowledge of the stock market**.**

Section II assessed behavioural biases, comprising statements corresponding to a specific bias derived from existing literature. These are broadly categorized into two latent constructs namely, Heuristics and Prospect Theory variables

To evaluate the agreement, score of each statement, responses were given points on a five-point Likert scale, with 1 point for "strongly disagree" and 5 points for "strongly agree." Structural Equation Modelling (SEM) was used to analyse the data and analyse the relation between prospect-based and heuristic behavioural biases. Further, descriptive analysis and Multivariate Analysis of Variance (MANOVA) was used to test the prominent behavioural bias and the influence of demographic variables on the identified behavioural biases.

RESULTS AND DISCUSSIONS

Table 1: Reliability Test

Construct	**AVE**	**√AVE**	**CR**	**Cronbach's Alpha**
Heuristics	0.605	0.778	0.899	0.89
Prospect Variables	0.584	0.764	0.958	0.91

Acceptable convergent validity is indicated by an Average Variance Extracted (AVE) value greater than 0.5. This cut off is exceeded by both constructs (Heuristics: 0.605, Prospect Variables: 0.584). It ought to exceed the constructs' correlation. This requirement is satisfied by Prospect Variables (0.764) and Heuristics (0.778). The construct's internal consistency is reflected in Composite Reliability (CR). A value above 0.7 is considered good. Strong reliability is shown by the Prospect Variables (0.958) and Heuristics (0.899). Another indicator of internal consistency is Cronbach's Alpha. Acceptable reliability is indicated by values greater than 0.7. Excellent consistency is demonstrated by the Prospect Variables (0.91) and Heuristics (0.89).

Table 2: Model Fit Indices

Index	**Value**	**Recommended Threshold**	**Interpretation**
Comparative Fit Index (CFI)	0.959	≥ 0.90	Excellent fit; adjusts for sample size and complexity.
Root Mean Square Error of Approximation (RMSEA)	0.09	< 0.08 (ideal), < 0.10 (acceptable)	Marginally acceptable fit; sensitive to model complexity.
Chi-square/degrees of freedom **(**CMIN/DF)	1.677	< 3.00	Good fit; lower values indicate better parsimony.
Tucker-Lewis Index (TLI**)**	0.945	≥ 0.90	Excellent fit; penalizes model complexity more than CFI.

Table 3: The Latent variables in Structural Equation Model

Latent variable	Notation	Statement	Factor Loading
Heuristics	e1	After an investment performs well, I often believe I could have predicted its success. (Hindsight Bias)	0.73
	e2	I tend to give more importance to recent market trends when making investment decisions. (Recency Bias)	0.96
	e3	I often make investment decisions based on information readily available, without thorough research. (Availability Bias)	0.62
	e4	I rely heavily on the first piece of information I come across when evaluating an investment. (Anchoring Bias)	0.65
	e5	I often seek out information that aligns with my existing beliefs about a particular investment. (Confirmation Bias)	0.73
	e6	When my investments perform well, I attribute it to my skill and knowledge rather than external factors. (Self-Attribution Bias)	0.92
Prospect Variables	e7	I tend to be overly optimistic about the future performance of my investments. (Optimism Bias)	0.76
	e8	I regret missed opportunities more than I appreciate successful investment choices. (Regret Aversion)	0.73
	e9	I find it challenging to sell a losing investment because of the amount I have	0.73

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		already invested in it. (Sunk Cost Fallacy)	
	e10	I have a tendency to sell winning investments quickly to secure profits but hold onto losing investments in the hope they will rebound. (Disposition Effect)	0.84

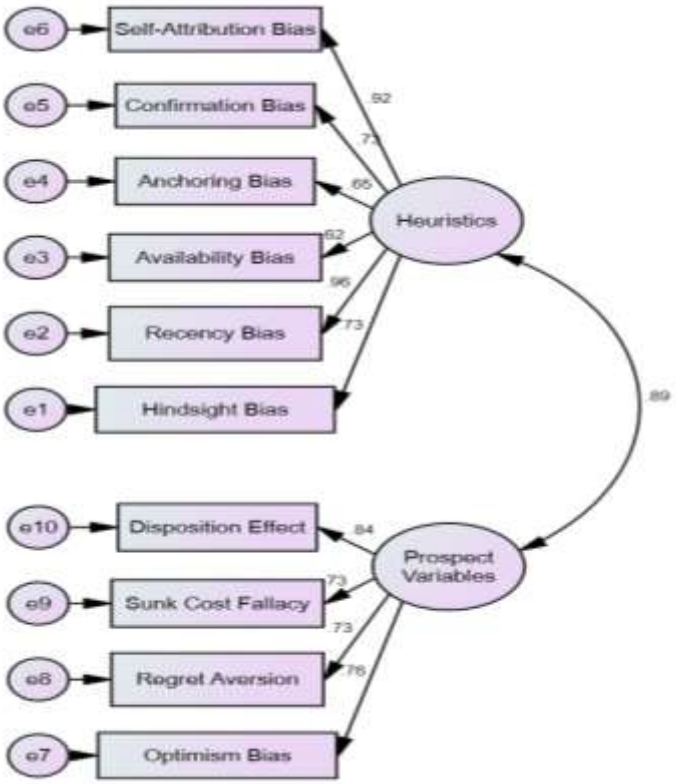

Fig 1: Structural Equation Model for Behavioural Biases

The diagram represents a Structural Equation Modelling (SEM) framework, which is a measurement Model, validating the grouping of behavioural biases under two latent constructs: Heuristics and Prospect Variables. This model is grounded in survey data, where each observed variable (e1 to e10) corresponds to a specific statement in the questionnaire assessing a particular behavioural bias.

Latent Construct 1: Heuristics

The Heuristics construct is operationalized using six observable variables (e1 to e6), each reflecting a specific behavioural bias. These variables represent responses to questionnaire items designed to measure the cognitive shortcuts or "rules of thumb" investors use. High factor loadings, particularly for Recency Bias and Self-Attribution Bias, indicate their strong contribution to the Heuristics construct.

Latent Construct 2: Prospect Variables

The Prospect Variables construct is captured through four indicators (e7 to e10), each reflecting a different bias associated with prospect theory. The Disposition Effect has a standardized factor loading of 0.84 under the Prospect Variables construct. This indicates a strong loading and confirms that the Disposition Effect is a highly influential indicator of the latent construct Prospect Variables.

Relationship Between Constructs

A strong positive correlation (r = 0.89) is observed between Heuristics and Prospect Variables, indicating that respondents who display high susceptibility to heuristic-driven biases also tend to show biases predicted by

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prospect theory. This supports the theoretical overlap and interconnectedness of these behavioural tendencies in investment decision-making.

Table 4: Descriptive analysis

Score	1.0		2.0		3.0		4.0		5.0		Total		
Biases	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Mean	Standard Deviation
Self-Attribution Bias	16	9.4	37	21.6	62	36.5	38	22.4	18	10.6	171	3.0	1.1
Confirmation Bias	12	7.1	28	16.5	37	21.6	62	36.5	32	18.8	171	3.4	1.2
Anchoring Bias	22	12.9	22	12.9	38	22.4	71	41.5	18	10.6	171	3.2	1.2
Availability Bias	30	17.6	62	36.5	37	21.6	32	18.8	10	5.9	171	2.6	1.2
Recency Bias	38	22.4	64	37.6	32	18.8	35	20.5	2	1.2	171	2.4	1.1
Hindsight Bias	28	16.5	35	20.5	52	30.6	42	24.7	14	8.2	171	2.9	1.2
Heuristics												2.93	.80
Disposition Effect	28	16.5	25	14.6	40	23.5	56	32.9	22	12.9	171	3.1	1.3
Sunk Cost Fallacy	30	17.6	42	24.7	38	22.4	49	28.6	12	7.1	171	2.8	1.2
Regret Aversion	25	14.6	36	21.2	52	30.6	50	29.4	8	4.7	171	2.9	1.1
Optimism Bias	26	15.3	26	15.3	56	32.9	48	28.2	15	8.7	171	3.0	1.2
Prospect Variables												2.96	1.00
Over all Behavioural Bias												2.94	.86

The findings from the descriptive analysis indicate that Confirmation Bias**,** Anchoring bias, and Disposition Effect are the most prominent behavioural biases influencing retail investors.

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Confirmation Bias recorded the highest mean score of 3.4 with 55.3% of respondents agreeing or strongly agreeing (scores 4 and 5), indicating a strong tendency among investors to accept that information which confirms their pre-existing beliefs or decisions. The mean score for Anchoring Bias is 3.2, suggesting that many investors (52.1%) tend to rely more on the first information or reference points while taking decisions. Disposition Effect**,** a key Prospect Theory bias, had a mean score of 3.1, with nearly 46% of respondents showing moderate to strong agreement. This reflects investors' inclination to sell stocks with high value too early and hold stocks with low value, in the hope they will rebound.

In contrast, Recency Bias and Availability Bias scored lower (means of 2.4 and 2.6 respectively), indicating that investors in this sample are less influenced by recent events or easily recalled information compared to more internalized cognitive patterns like self-justification or belief confirmation.

Table 5: Multivariate ANOVA results

Dependent Variable		F	P value		Partial Eta Squared
Heuristics	Gender	3.476	0.066	NS	0.047
	Educational Background	0.839	0.437	NS	0.023
	Occupation	1.286	0.286	NS	0.052
	Annual Income	0.824	0.537	NS	0.055
	Knowledge about the stock market before trading	2.352	0.103	NS	0.062
Prospect Variables	Gender	4.167	0.045	sig	0.055
	Educational Background	0.141	0.869	NS	0.004
	Occupation	2.422	0.073	NS	0.093
	Annual Income	0.311	0.905	NS	0.021
	Knowledge about the stock market before trading	1.533	0.223	NS	0.041
Over all Behavioural Bias	Gender	4.204	0.044	sig	0.056
	Educational Background	0.347	0.708	NS	0.010
	Occupation	1.918	0.134	NS	0.075
	Annual Income	0.449	0.812	NS	0.031
	Knowledge about the stock market before trading	2.051	0.136	NS	0.055

Table 5 shows the results using Multivariate Analysis of Variance (MANOVA). The analysis examined whether demographic factors such as gender**,** educational background**,** occupation**,** annual income**,** and prior stock market knowledge significantly influence the presence of heuristic biases**,** prospect theory-related biases, and overall behavioural biases among retail investors.

Gender had a statistically significant effect on Prospect Variables ($F = 4.167$, $p = 0.045$, $\eta^2 = 0.055$) and Overall Behavioural Bias ($F = 4.204$, $p = 0.044$, $\eta^2 = 0.056$). However, the effect of gender on Heuristics was not statistically significant ($F = 3.476$, $p = 0.066$, $\eta^2 = 0.047$). H_{02} and H_{03} are rejected, emphasizing that gender significantly influences prospect-related and overall behavioural biases. H_{01} is supported, emphasizing

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that in heuristic biases, no significant gender difference is seen. Education does not significantly affect any of the bias categories. Heuristics (F = 0.839, p = 0.437), Prospect Variables (F = 0.141, p = 0.869), Overall Behavioural Bias (F = 0.347, p = 0.708). Thus, H_{04}, H_{05}, and H_{06} are supported.

Occupation does not significantly affect any of the dependent variables. Heuristics (F = 1.286, p = 0.286), Prospect Variables (F = 2.422, p = 0.073), Overall Behavioural Bias (F = 1.918, p = 0.134). Hence, H_{07}, H_{08}, and H_{09} are supported. Annual income showed no significant influence on; Heuristics (F = 0.824, p = 0.537), Prospect Variables (F = 0.311, p = 0.905), Overall Behavioural Bias (F = 0.449, p = 0.812). Accordingly, H_{10}, H_{11}, and H_{12} are supported.

Whether the investor had prior knowledge about the stock market before trading did not significantly influence; Heuristics (F = 2.352, p = 0.103), Prospect Variables (F = 1.533, p = 0.223), Overall Behavioural Bias (F = 2.051, p = 0.136). Therefore, H_{13}, H_{14}, and H_{15} are supported**.**

In the overall demographic factors, gender shows a statistically significant impact on both Prospect Variables and Overall Behavioural Bias. This suggests that men and women differ meaningfully in how behavioural biases affect their investment decisions.

Other demographic factors (education, income, occupation, and prior knowledge) do not show statistically significant effects, implying that behavioural biases surpass traditional demographic distinctions.

FINDINGS

An analysis of SEM for behavioural bias showed high factor loading for Recency Bias and Self-Attribution Bias under heuristics. This aligns with earlier studies that highlight the quick mental shortcuts investors use. Mushinada & Veluri, (2019) pointed out the strong link between self-attribution and overconfidence, suggesting that investors who credit their successes to their own skill are more likely to make biased decisions. Similarly, Keller & Pastusiak, (2016) found that decisions driven by heuristics, like recency-based judgments, are often shaped by external influences such as stock recommendation reports. This study strongly supports the view that these biases are deeply embedded in the cognitive frameworks that retail investors use to process market information.

The study shows that the Disposition Effect is the most significant bias in the context of prospect theory. This finding backs up the work of Arora & Rajendran, (2023)who noted that this bias is more pronounced in volatile market conditions and negatively impacts portfolio performance. Ullah et al., (2020) also observed that the disposition effect consistently affects various types of investors in Pakistan. These results suggest that the reluctance to realize losses is a common behaviour among retail investors, particularly in less efficient or emerging markets like India.

A strong positive correlation (r = 0.89) between heuristic and prospect-related biases suggests that these cognitive and emotional patterns are interconnected. It supports the theoretical framework introduced by Shunmugasundaram & Sinha, (2024) who described a cognitive-emotional loop where overconfidence and the disposition effect reinforce one another. Furthermore, Chaudhary et al., (2025) highlighted the moderating role of risk perception between heuristic biases and investment decisions, which further highlights the interconnected nature of these behavioural constructs.

This study explored the effect of demographic factors on behavioural biases among retail investors, with a specific focus on heuristics-based and prospect theory-based constructs. Gender was a significant factor affecting both prospect-related and overall behavioural biases, but not heuristics alone. This finding is consistent with the research of Khilar & Singh, (2019) and Mushinada & Veluri, (2019), both of whom identified gender as a key factor influencing susceptibility to specific biases like overconfidence and regret aversion. These results suggest that emotional and cognitive processing may differ between genders, subtly affecting investment behaviour.

An interesting finding from the descriptive analysis was that respondents who reported uncertainty about their initial knowledge of the share market exhibited the highest levels of heuristic and prospect-related biases. This supports the work of Srinivasan & Karthikeyan, (2023) indicating that people with unclear or inflated views of their financial literacy are more prone to behavioural errors, which can hinder rational investment decisions.

Overall, the findings confirm that behavioural biases are deeply rooted in investor psychology and often go beyond traditional demographic lines, except for gender. The relationship between heuristic and prospect theory constructs reflects a complex behavioural system where cognitive shortcuts and emotional reactions blend to shape financial behaviour.

CONCLUSION AND MANAGERIAL IMPLICATIONS

The contribution of this study is that it validates the role of heuristics and prospect theory in explaining how retail investors make decisions. Identifying Confirmation Bias, Disposition Effect, and Self-Attribution Bias as the main behavioural biases that affect individual investment behaviour in emerging markets. The strong connections of Recency Bias and Self-Attribution Bias with the Heuristics construct, along with the prevalence of the Disposition Effect within the Prospect Theory framework, support the idea that investor decisions are not completely rational. Instead, they are influenced by mental shortcuts and emotional reactions related to losses Kahneman & Tversky, (1979).

The study expands behavioural finance theory by connecting demographic factors to susceptibility to biases. Gender was identified as a key factor that affects how biases manifest, showing that personal and social identity elements may influence behavioural tendencies.

Overall, the study stresses the importance of investor education that addresses specific behavioural patterns. Promoting financial literacy, improving risk perception, and encouraging careful decision-making are crucial to reducing the impact of cognitive and emotional biases. This research study gives valuable information to policymakers, educators, and financial advisors looking to foster more rational investment behaviour among retail investors.

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