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Diagnosing Investment Decision Failures: A Forensic Behavioral Framework of Prospect-Related Biases, Cognitive Dissonance and Investment Decision Quality (IDQ)

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Abstract
Investment decision failures are products of complex behavioural processes, and not cognitive errors in isolation. This paper builds upon Prospect Theory and Cognitive Dissonance Theory to construct and empirically test a mechanism-based behavioural model of how prospect-related biases impair the quality of investment decisions due to cognitive dissonance, and bias blind spot serves as a moderating factor. Prospect-related biases is conceptualized as a formative second-order construct, which consists of loss aversion, regret aversion, framing effect and sunk cost fallacy whereas Investment Decision Quality (IDQ) is also modelled as a formative second-order dependent variable, which includes process rationality, portfolio appropriateness and outcome satisfaction. Based on survey data of 540 individual investors, IBM SPSS Statistics and a partial least squares structural equation modeling (PLS-SEM), the study is aimed at testing a moderated mediation model with higher-order constructs. The findings indicate that prospect-related biases have a considerable negative direct influence on IDQ and a positive influential impact on cognitive dissonance that in turn has a resounding negative impact on decision quality. The connection between prospect-related biases and IDQ is mediated in part by Cognitive dissonance and the impact of prospect-related biases on dissonance is amplified by bias blind spot. The formative assessments indicate disproportionality in the contribution of the dimensions in both second-order constructs confirming their configurational nature and allowing reverse (forensic) inference. This paper combines an exploration of behavioural antecedents and decision outcomes as higher-order formative constructs to bring behavioural finance to a process-based and diagnostically valuable interpretation of investment decision failure. Notably, the framework allows forensic determination of behavioural weaknesses that cause repeated decision failures, by considering investment decision quality as a diagnostic measure, as opposed to a performance outcome.

Keywords: *Prospects-related Biases, Behavioral Biases, Investment Decision Quality (IDQ), Cognitive Dissonance, Bias Blind Spot, Forensic Framework*

1. Introduction
Investment decision-making has increasingly come to be seen as a psychologically oriented process, rather than an entirely rational process. Modern behavioral finance studies indicate that investors compare gains and losses against reference points, and they are systematically

affected by emotional and cognitive reactions to results that are in line with the main propositions of Prospect Theory (Kahneman and Tversky, 1979; Shah et al., 2018; Ahmad, 2024). The recent empirical research also testifies to the fact that these reference-dependent decisions continue to remain across different markets, market conditions and types of investors, and they influence judgments and choices in situations of uncertainty (Hoffmann and Post, 2017; Mer and Vishwakarma, 2024).

Based on this premise, recent literature suggests a list of prospect-related biases that continuously sabotage investment decisions. Loss aversion, regret aversion, framing effects, and the sunk cost fallacy have been demonstrated to have a high and enduring impact on how investors understand information, make decisions, and respond to unfavorable results (Shah et al., 2018; Zahera and Bansal, 2018; Mer and Vishwakarma, 2024). Both emerging and developed markets show that these biases do not work alone, but, in fact, investors tend to have several prospect biases at the same time, which strengthens biased decisions in the long term (Hoffmann and Post, 2017; Ahmad and Shah, 2020).

Notably, prospect biases are not simply relevant to outcomes; rather, they actively influence internal psychological conflict in the decision-making process. The future-oriented anticipations regarding the acceptable gains, break-even points, or tolerable losses are established at an early stage and when the market information does not match the initial set expectations, the investors develop a state of psychological tension. This phenomenon is conceptualized as cognitive dissonance that develops when beliefs, preferences, and new evidences are inconsistent (Bell, 1982; Shah et al., 2018; Ahmad, 2024). According to recent behavioral research, such dissonance is often caused during decision-making, not only post-factum (Hoffmann and Post, 2017; Mer and Vishwakarma, 2024).

Prospect biases consistently raise cognitive dissonance. Loss-averse investors face conflict between following analytical signals to exit and emotional discomfort to realizing losses; regret-averse investors struggle against a conflict between action and fear of self-blame; framing effects put into tension when negative information clash with prior optimism; and sunk costs increase discomfort by tying decisions to past commitments (Shah et al., 2018; Ahmad & Shah, 2020; Mer & Vishwakarma, 2024). To reduce this discomfort, investors often use dissonance-reduction strategies such as selective attention, rationalization, decision delay, or escalation of commitment rather than objective reassessment (Hoffmann & Post, 2017; Zahera & Bansal, 2018).

These dissonance-reduction methods directly degrade Investment Decision Quality (IDQ). During decision formation, they decrease process rationality by discouraging balanced search of information and probabilistic reasoning. After decisions are made, they distort learning and correction, contributing to continued patterns such as holding losing positions, misalignment between risk profiles and portfolios, and chronic dissatisfaction with outcomes (Hoffmann & Post, 2017; del Pozo, 2024; Mer & Vishwakarma, 2024). Over time, this creates a reinforcing cycle in which prospect biases raise dissonance, dissonance decrease decision quality, and poor decisions further entrench biases.

In this study, Investment Decision Quality (IDQ) is conceptualized as a formative second-order construct having three distinct dimensions: process rationality, portfolio appropriateness, and outcome satisfaction. This approach advances the literature beyond unidimensional or reflective measures of decision quality capturing decision effectiveness as a combination of process, alignment, and satisfaction (Hoffmann & Post, 2017; del Pozo, 2024). Flaws in any one dimension represent substantive decision failures rather than similar measurement error.

Crucially, this study also conceptualizes prospect-related biases as a formative second-order construct, formed by loss aversion, regret aversion, framing effect, and sunk cost fallacy. Prior empirical research overwhelmingly examines these biases individually or models them reflectively, implicitly assuming that they are interchangeable indicators (Zahera & Bansal,

2018; Shah et al., 2018). To the best of our knowledge, no prior study has simultaneously modeled prospect biases and IDQ as formative second-order constructs within a single structural framework, particularly in an investment context.

Beyond its theoretical contribution, the proposed model adopts a forensic perspective on investment decision-making. Persistent patterns of low IDQ—such as repeated portfolio misalignment, unjustified commitment to underperforming investments, and chronic dissatisfaction—can serve as behavioral red flags for mis-selling, unsuitable advice, or exploitation of behavioral vulnerabilities (Hunjra et al., 2012; Awais et al., 2023; del Pozo, 2024). This shifts attention from isolated transactions to systematic decision-quality failures observable across clients or over time.

A key boundary condition in the process is the biased self-awareness (bias blind spot), which is not the awareness of their biases but rather the bias blind spot or the tendency of investors to perceive cognitive biases in others, and at the same time to underestimate their impact on their own judgments. Investors with a high blind spot view their choices as being objective and rational even in the events when the prospect-related biases are influencing their judgments. The recent behavioral evidence demonstrates that this form of bias blind spot diminishes the willingness to receive corrective information and increases the psychological discomfort when expectations are challenged, thus increasing cognitive dissonance (Shah et al., 2018; Ahmad and Shah, 2020). In contrast, the reduced bias blind spot levels undermine defensive justifications and enable investors to recognize internal conflict, which regulates the transfer of prospect biases into decision distortion instigated by dissonance (Awais et al., 2023). In this light, the conditions of bias blind spot moderate the quality of the relationship between prospect biases and cognitive dissonance, the stronger the bias blind spots the stronger their negative influence on Investment Decision Quality and the weaker the bias blind spots the weaker their negative influence on Investment Decision Quality.

Although the current literature on Prospect Theory and behavioral biases is quite extensive, not one of them combines the prospect biases, cognitive dissonance, bias blind spot, and the quality of investment decisions into one moderated-mediation model, and most of them are not based on a reflective-formative second-order specification with a forensic orientation (Zahera & Bansal, 2018; Hoffmann & Post, 2017; del Pozo, 2024). This exclusion weakens theoretical integration as well as regulatory applicability.

Nevertheless, the current studies are still disjointed in three major areas. To begin with, prospect-related biases are studied primarily at an individual level as opposed to a configurational phenomenon. Second, the performance-based or unidimensional measure of investment outcomes is generally used to examine the outcomes without considering the quality of decisions as a multidimensional construct. Third, there is little research that combines behavioral antecedents and decision outcomes in a unitary moderated-mediation model, especially with formative higher-order specifications. These loopholes limit theoretical incorporation as well as practice diagnostic applicability.

This study fills these gaps directly by suggesting a moderated-mediation model where formative second-order prospect biases affects the formative second-order IDQ using the mediation of dissonance and moderation of bias blind spot. The framework gives a modern, methodologically new and forensically applicable account of how behavioral biases systematically impair the quality of investment decisions and how those failures can be realized and removed.

In addition to its behavioral contribution, this study also takes a forensic behavioral viewpoint by considering the quality of the investment decision as a diagnostic result, instead of a performance result. Continued weaknesses in IDQ, including low process rationality, poor portfolio fit, or inconsistent satisfaction of the outcomes, can be indicators of underlying behavioral frailty before financial damage, mis-selling, or inappropriate advice. In this respect,

the given framework is forensic in a preventive and analytical sense, as it allows recognizing the behavioral threat at an early stage of its manifestation by the time visible losses or violations of regulations take place.

2. Literature Review

2.1 Prospect-Related Biases in Investment Decisions

Prospect Theory offers a theoretical basis of irrational decision-making under risk elucidating that investors consider outcomes in relation to reference points and are disproportionately sensitive to gains and losses (Kahneman and Tversky, 1979; Shah et al., 2018; Ahmad, 2024). The later works in the field of behavioral finance prove that these reference-dependent judgments continue to prevail in different markets, market circumstances and among different types of investors, affecting the way in which investment information is framed and decisions are rationalized (Zahera and Bansal, 2018; Hoffmann and Post, 2017).

Some of the distinct prospect-related distortions, such as loss aversion, regret aversion, framing effect, or the sunk cost fallacy, are always noted to be the most powerful biases shaping investment behavior (Shah et al., 2018; Mer and Vishwakarma, 2024). Recent findings indicate that these prospect biases are often compounded, and investors often exhibit several bias types at the same time, which single-bias models fail to account for (Ahmad and Shah, 2020; Mer and Vishwakarma, 2024). This co-occurrence justifies the treatment of prospect biases as a group behavioral phenomenon, as opposed to being singular phenomena.

2.1.1 Loss Aversion

Loss aversion is the ability of investors to feel losses more than the corresponding gains, leading to their unwillingness to realize losses and ineffective adjustments to their portfolios (Hoffmann and Post, 2017; Shah et al., 2018). Empirical research studies associate loss aversion with holding of losing assets, excessive conservatism and delayed corrective action, which weakens rational investment decision-making (Ahmad, 2024).

2.1.2 Regret Aversion

The fear of regret occurs when investors want to avoid making decisions that could cause them to feel blame towards themselves later. Instead of maximizing returns, regret-averse investors wait longer to make decisions, act in a way of consensus, or make a decision that is less risky (Shah et al., 2018; Zahera and Bansal, 2018). Empirical studies correlate regret aversion with delayed decisions, missed opportunities, and poor timing (Mer and Vishwakarma, 2024).

2.1.3 Framing Effect

The framing effect proves that the same information about investments may cause different decisions when the results are reported in terms of gains or losses. Recent research demonstrates that the effects of framing are particularly significant in complicated investment contexts where the evaluative clarity is low (Zahera and Bansal, 2018; Shah et al., 2018). This bias affects the interpretation of risk and value by investors even in the case of unchanged underlying information.

2.1.4 Sunk Cost Fallacy

The sunk cost fallacy is an attribute that depicts the propensity of investors to keep investing in losing assets because of their past costs rather than focusing on their future prospects. This bias has been empirically connected to escalation of commitment, delayed exit, and poor performance over the long term (Hoffmann and Post, 2017; Mer and Vishwakarma, 2024). Sunk cost behavior sheds light on the aspect of self-justification in maintaining sub optimum investment choices.

2.2 Prospect-Related Biases as a Formative Higher-Order Construct

Even though loss aversion, regret aversion, framing effect, and sunk cost fallacy vary in relation to their psychological basis and behavioral expression, they are collectively applied in how investors assess gain, losses, and commitment. The assumption of interchangeability in treating these biases as reflective indicators is theoretically problematic because of the mechanisms of these biases that are different (Shah et al., 2018; Zahera and Bansal, 2018). Rather, each bias play a unique role in the general behavioral distortion, which favors a second-order specification being formative.

Although there is growing awareness of bias co-occurrence, empirical research seldom operationalizes prospect biases as a hierarchical forming construct. The majority of studies represent these biases as independent or reflective, which does not allow capturing the combined effect on decision processes and results.

2.3 Cognitive Dissonance in Investment Decision-Making

Cognitive dissonance is a term used to describe psychological tension because of incongruent beliefs, expectations, or information (Festinger, 1957; Bell, 1982). The phenomenon of dissonance is typical in investment situations, when prospect expectations are opposed to analytical indicators or market results (Shah et al., 2018; Hoffmann and Post, 2017). Recent behavioral research points out that cognitive dissonance is usually realized during decision making and not only after the outcomes are realized. Cognitive dissonance in this paper is studied during the decision-making phase and immediately after the decision that disrupts the ability to analytically reassess, learn and update beliefs, as opposed to a delayed emotional response to the understood consequences. When an objective assessment of the situation implies a certain course of action and emotional bias drives in a different direction, investors feel tension (Mer and Vishwakarma, 2024; Ahmad and Shah, 2020). This tension is compounded by prospect biases which inject emotional interests into decision appraisal.

To minimize dissonance, investors often use justification strategies, which can include selective information processing, rationalizing losses, or committing increasing amounts of resources instead of recalculating (Zahera and Bansal, 2018; Hoffmann and Post, 2017). These are the actions that cause long-term distortion of decisions.

2.4 Bias blind spot

The bias blind spot, also referred to as biased self-awareness is the tendency of individuals to recognize cognitive biases in others and underestimate their impact on their own decisions. This blind spot causes investors to view their decisions as objective in situations where prospect biases are underway (Ahmad and Shah, 2020; Awais et al., 2023).

It has been empirically indicated that strong bias blind spots lead to decreased openness to corrective information and enhanced use of justification strategies when expectations are disrupted (Shah et al., 2018; Awais et al., 2023). On the other hand, decreased levels of bias blind spot will help to recognize internal conflict and correct analytically. Accordingly, bias blind spot moderates the extent to which prospect biases lead to cognitive dissonance and consequently distort decision.

2.5 Investment Decision Quality (IDQ) as a Formative Construct

Investment Decision Quality measures the efficiency of decision-making regardless of any actual market performance. The latest works conceptualize the concept of IDQ as a multidimensional one that includes process rationality, portfolio appropriateness, and outcome satisfaction (Hoffmann and Post, 2017; del Pozo, 2024). These dimensions indicate the decision-making process, its correspondence to the goals and limitations of the investors, and the measurement of results.

IDQ dimensions are non-substitutable: disciplined processes do not ensure the right portfolios, and good results might be due to the presence of luck, instead of the quality of decisions. This framework helps to model IDQ as a second-order construct that is formative, which is not a common method in the current studies. Formative treatment of IDQ variable enables a more accurate depiction of the effectiveness of decisions in various dimensions.

IDQ enables the researcher and practitioner to not only determine whether a decision was good or bad, but why. Unresolved dissonance or high degrees of biases will likely result in a decision with low process rationality (lack of structure), inappropriate portfolio selection and unstable satisfaction. These render IDQ an effective prism of analyzing investor behavior and pinpointing the psychological processes causing poor financial decisions.

2.6 Forensic Behavioral Perspective in Investment Decision-Making

A behavioral finance forensic perspective is concerned with diagnosis of underlying behavioral weaknesses based on observable decision outcomes as opposed to just explaining behavior. Using the behavioral diagnostics and forensic accounting, this method interprets the chronic nature of deficiencies in the quality of decisions as the evidence of underlying cognitive and emotional distortions. Although this diagnostic orientation has the potential to be relevant in the context of investor protection and regulatory oversight, it is not yet a well-investigated part of the investment decision-making research. By combining forensic reasoning with behavioral finance, decision failures can be explained and also identified and detected systematically and at earlier stages.

2.7 Synthesis and Research Gap

It has been shown in the literature that prospect-related biases are distortive of investment behavior, cognitive dissonance is an influential psychological mechanism, bias blind spot leads to susceptibility to correction, and IDQ is a useful outcome measure. Nonetheless, only few studies combine these factors into one model of processes and none of them operationalize both prospect biases and IDQ as formative second-order variables in the same model. Filling this gap will allow having a more comprehensive perspective on how behavioral biases systematically weaken the quality of investments decisions.

2.8 Conceptual Framework and Hypotheses Development

The expectations of gains and losses and outcomes as perceived by individuals in comparison to inner reference points are fundamental to the uncertainty in decision-making by investors. Prospect Theory suggests that people do not make investment decisions based on the expected utility, but rather on psychologically motivated judgments, overweighting losses, regret anticipation and asymmetric responses to information framing (Kahneman and Tversky, 1979; Shah et al., 2018; Ahmad, 2024). These predispositions lead to a complex of prospect-related biases, i.e. loss aversion, regret aversion, framing effect and sunk cost fallacy which make the complex financial judgments easier and add systematic distortion in processing and evaluation of information.

In contrast to single cognitive biases, prospect-related biases are behavioral forces that interact and in aggregate, affect the way investors perceive information, evaluate risk, and make decisions. Loss aversion makes people more sensitive to possible losses, regret aversion makes them unwilling to take action, presentation can cause preferences to change with framing, and sunk costs attach themselves to the decision, anchoring it to previous commitments. Modern behavioral studies demonstrate that investors tend to have several prospect biases at once, and they create compounded distortions that cannot be well modeled using single-bias models (Zahera and Bansal, 2018; Mer and Vishwakarma, 2024). This interdependence offers solid theoretical support to the idea of modelling prospect biases as a formative second-order factor

with each bias contributing in a unique and non-substitutable way to the overall behavioral tendency.

The effects of prospect biases on investment outcomes are not direct however. Cognitive dissonance is the psychological process that converts biased judgments into observable decision failures, and is based on Cognitive Dissonance Theory (Festinger, 1957; Bell, 1982). Cognitive dissonance occurs when the expectation of investors driven by prospect is in contradiction with the analytical evidence, market signals, or internal investment criteria. This uneasiness manifests itself in two important stages in the investment environment. First, when making decisions, dissonance is experienced when emotional defense against losses, fear of regrets, or allegiance to previous knowledge conflicts with opposing information. Instead of analytic solutions to this conflict, investors tend to minimize the discomfort by making their assessment consistent with the bias and thus they distort the rationality of the process.

Second, cognitive dissonance reappears once decisions have been made especially when the results are disappointing or do not agree with what was anticipated before. Research on behavioral finance demonstrates that investors cope with this post-decision dissonance through rationalization of losses, selective attention with regard to confirmatory information, delay in taking corrective action, or increased commitment to failing investments (Shefrin and Statman, 1985; Arkes and Blumer, 1985). These reactions maintain the original bias and enhance its force on later judgments and form a vicious cycle of psychological processes, in which the biased judgment, the feeling of dissonance, and the errors in decision-making sustain one another.

The aggregate effect of such processes is manifested in the Investment Decision Quality (IDQ) the ultimate result variable in the suggested framework. IDQ is theorized as a second-order construct having three non-substitutable dimensions (portfolio appropriateness, outcome satisfaction, process rationality) (Hoffmann and Post, 2017; del Pozo, 2024). Process rationality measures the degree to which investment choices are made based on a structured and unbiased assessment; portfolio appropriateness measures the correspondence between decisions and the goals, horizon, and risk tolerance of the investor; and outcome satisfaction measures whether investors believe their decisions to be justified despite market noise. The weakness in any dimension constitutes substantive failures of decisions, making a formative specification reasonable.

The intensity of the relationship between prospect biases and cognitive dissonance is conditioned by a bias blind spot. Bias blind spot is the inclination that investors have of acknowledging cognitive biases in others but underestimating its effect on their own decisions. Strong blind-spot investors feel that their judgments are objective and rational even in instances where prospect biases are operating. In the face of conflicting information, these investors will tend to resolve dissonance by justification than by reflection, which increases the effect of prospect biases on cognitive dissonance (Ahmad and Shah, 2020; Awais et al., 2023). On the other hand, reduced bias blind spot strengthens the defensive process and enables investors to endure dissonance to a sufficient duration to conduct corrective analysis.

Based on these theoretical premises, the theory of the proposed framework assumes a moderated mediation framework according to which prospect-related biases collectively alter information appraisal, create cognitive dissonance during and after decision-making and, thus, impair the quality of investment decisions. The bias blind spot moderates the connection between prospect biases and cognitive dissonance, reinforcing or diminishing the conversion of biased assessments into psychological uneasiness and consequently decision distortion.

Based on this, the framework proposes the following propositions: Prospect-related biases, a second-order formative variable, create judgments and evaluation distortions. These distortions create a cognitive dissonance in the process and post decision-making in investment. Cognitive dissonance diminishes the quality of investment decision (IDQ) along its dimensions of

formation. Bias blind spot is a moderator, which increases or diminishes the influence of prospect biases on cognitive dissonance.

The theoretically synthesized model offers a psychologically based description of the translation of gain-loss evaluations into quality of decision. It describes the circumstances under which behavioral distortions will most probably be maintained.

It is worth noting that the suggested framework is in contrast to behavioral models explaining the failure of decisions mostly as a result of misperception of risk. Although these models focus on skewed probability evaluation, the current model describes the failure of decisions by the psychological conflict and justification mechanisms that occur due to prospect-related biases. Cognitive dissonance is thus a completely different process in behavior, which functions by inner conflict and unwillingness to change beliefs instead of poor risk estimation. As such, this framework is complementary to, rather than overlapping with, risk-perception-based behavioral models.

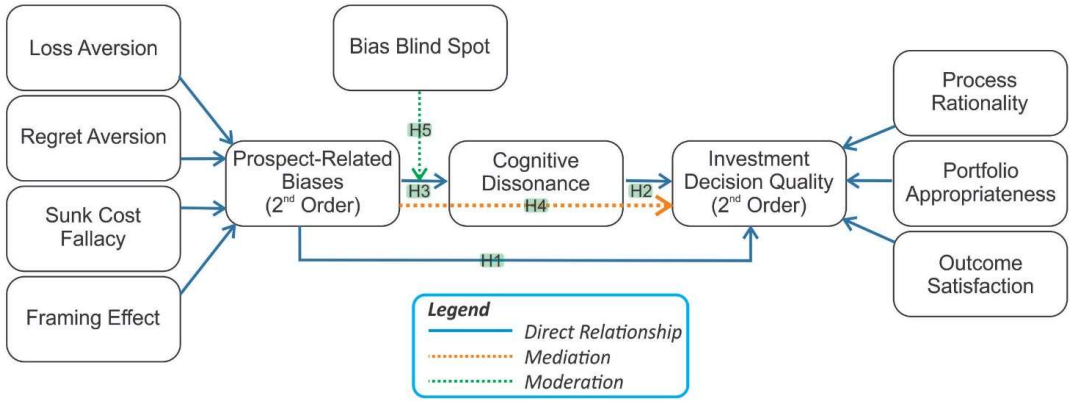

Figure 1. Proposed Conceptual Framework

Based on the theoretical framework above (see Figure 1), the following hypotheses are proposed:

H1: *Prospect-related biases (loss aversion, regret aversion, framing effect, and sunk cost fallacy), modeled as a formative second-order construct, have a negative effect on investment decision quality (IDQ).*

H2: *Cognitive dissonance has a negative effect on investment decision quality (IDQ).*

H3: *Prospect-related biases have a positive effect on cognitive dissonance during and after investment decision-making.*

H4: *Cognitive dissonance mediates the relationship between prospect-related biases and investment decision quality (IDQ).*

H5: *Bias blind spot moderates the relationship between prospect-related biases and cognitive dissonance.*

3. Methodology

The research design used in this study is quantitative and cross-sectional to investigate empirically a mechanism-based behavioral framework using cognitive dissonance to relate prospect-related biases with the quality of investment decisions. The structured questionnaire was used to collect data by using both online and field-based methods of sample. The respondents were informed that participation was voluntary and that their anonymity would be guaranteed to minimize response bias. Following the data screening process, 540 valid

responses were selected to be analyzed, which satisfies the recommended sample size criteria of the partial least squares structural equation modeling (PLS-SEM).

Measurement of all the constructs was based on previously validated scales modified to fit the investment decision setting with responses taken on a five-point Likert scale of strongly disagree (1) to strongly agree (5). Prospect biases were theorized as a formative second-order construct, which has four reflective first-order dimensions, including loss aversion, regret aversion, sunk cost fallacy, and framing effect. This specification assumes that these biases collectively influence the behavioral tendencies of investors when planning in the future, and that each of the dimensions has a unique contribution to the overall construct. The construct of cognitive dissonance was defined as reflective construct that reflects psychological discomfort in the course of decision-making process when beliefs, information and expected outcomes are incongruent. The quality of investment decisions was modeled as a formative second order construct (three reflective dimensions, namely, process rationality, portfolio appropriateness and outcome satisfaction) in line with decision-quality literature that emphasizes multidimensional assessment of investment choices. Bias blind spot was assessed as a reflective measure and fitted as a mediator of relationship between prospect bias and cognitive dissonance.

The particularity of this research is the simultaneous modeling of the independent and dependent variables as formative second-order variables. The previous behavioral finances studies have mainly analyzed individual first-order biases and compared the results on single-dimensional indications or performance measures. Prospect-related biases are, in contrast, conceptualized here as a configurational behavioral force, which is collectively constituted by a number of prospect-based tendencies, and investment decision quality as a multidimensional evaluative construct. This is a higher-order specification that is theoretically correct as omission of any dimension would change the concept of the construct, and reflective modeling would not be consistent with their formative nature.

The suggested framework was evaluated with the help of PLS-SEM in SmartPLS. The use of this technique was based on its appropriateness to models with formative higher-order constructs, mediation and moderation effects, and few distributional assumptions. The indicator loading, composite reliability, average variance extracted and discriminant validity were used to assess the reflective measurement models based on the established criteria. In the case of formative constructs, the variance inflation factors were analyzed to determine the multicollinearity and the importance of the weights of the indicators were determined by bootstrapping. Assessment of the structural model was done based on the path coefficients, coefficients of determination (R^2) and effect size (f^2). Bootstrapped indirect effects were used to test mediation effects and interaction terms were used to test moderation. To overcome the possible common method bias, a complete collinearity test was performed, and variance inflation factors were under the recommended values, meaning that the findings were not likely to be affected by common method bias.

Moreover, a forensic behavioral analysis with the help of IBM SPSS statistics is incorporated to reveal underlying profiles of investors, distortions of behavior and patterns of diagnosis in decision-making. This analytical approach combines both theory testing and behavior interpretation and provides a holistic opinion on the impact of prospect-related biases and cognitive dissonance on the quality of investment decisions.

4. RESULTS

4.1 Overview of Results

This part gives the empirical results of the research in terms of two-stage disjoint approach using Partial Least Squares Structural Equation Modeling (PLS-SEM) with an addition of SPSS-based forensic analysis. The analysis is structured and it starts with an evaluation of the

reflective measurement model (stage one), and then the assessment of higher-order formative constructs (stage two). The structural model is then tested to test the hypothesized relationships that include the mediation and moderation effects. Besides the model-based results, descriptive statistics, and demographic features are also presented to give the background information about the sample. Lastly, a forensic behavioral analysis with the help of IBM SPSS statistics is incorporated to reveal underlying profiles of investors, distortions of behavior and patterns of diagnosis in decision-making. This analytical approach combines both theory testing and behavior interpretation and provides a holistic opinion on the impact of prospect-related biases and cognitive dissonance on the quality of investment decisions.

4.2 Sample Characteristics and Descriptive Statistics

Table 1. Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	449	83.15
	Female	91	16.85
Age (in years)	25 – 34	188	34.81
	35 – 44	155	28.7
	45 – 54	96	17.78
	55 and above	59	10.93
	Below 25	42	7.78
Marital Status	Married	339	62.78
	Single	172	31.85
	Divorced / Widowed	29	5.37
Highest Educational Qualification	BS (4-Year / Hons – 16 years)	178	32.96
	Master's Degree	117	21.67
	Bachelor's Degree	99	18.33
	Professional Degree	67	12.41
	Intermediate or below	44	8.15
	MPhil / MS	20	3.7
	PhD or equivalent	15	2.78
Occupation	Private Sector Employee	202	37.41
	Self-Employed / Business	150	27.78
	Government Employee	92	17.04
	Student	65	12.04
	Unemployed / Retired	31	5.74
Investment Experience	1 – 5 years	221	40.93
	6 – 10 years	140	25.93
	Less than 1 year	83	15.37
	11 – 15 years	50	9.26
	More than 15 years	46	8.52
Annual Income (PKR)	500,000 – 999,999	145	26.85
	1,000,000 – 1,999,999	144	26.67
	Less than 500,000	93	17.22
	2,000,000 – 2,999,999	82	15.19
	Above 3,000,000	47	8.7
	Prefer not to disclose	29	5.37

The sample consists of 540 investors who have various demographic features. The majority are male (83.15%), with the largest age group between 25–34 years (34.81%), followed by 35–44 years (28.70%). The majority of the respondents are married (62.78%), and have higher education degrees, especially undergraduate. The occupational distribution is characterized by prevailing numbers of employees in the private sector and self-employed people, with the majority of the investors being of 1-5 years of experience. There is a rather balanced income within middle-income groups (see Table. 1).

4.3 Descriptive Statistics of Variables

The descriptive statistics reveal moderate values in prospect-related biases (Mean = 3.065), as well as, cognitive dissonance (Mean = 2.90). There are also moderate levels in terms of investment decision quality (Mean = 2.9689). The process rationality dimension is relatively high and the outcome satisfaction and portfolio appropriateness have lower values indicating structural weaknesses in decision outcomes. All the variables have reasonable standard deviations and normality, which favor the strength of the further PLS-SEM analysis (see Table.2).

Table 2. Construct-Level Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
LA	540	1	5	3.119	0.722	0.02	-0.193
RA	540	1.25	5	3.048	0.691	-0.058	-0.234
SC	540	1	5	2.972	0.717	0.016	-0.247
FE	540	1.25	5	3.120	0.645	0.091	-0.266
CD	540	1.4	4.8	2.900	0.657	0.159	-0.171
BS	540	1	5	2.986	0.759	-0.034	-0.105
OS	540	1.2	5	2.928	0.690	0.035	-0.157
PA	540	1.33	4.83	2.908	0.667	0.133	-0.419
PR	540	1.25	5	3.070	0.672	0	-0.3
PROS	540	1.71	4.52	3.065	0.506	0.052	-0.252
IDQ	540	1.49	4.66	2.968	0.542	0.088	-0.182

4.4 Measurement Model Assessment (Stage One)

The reflective measurement model was tested on the basis of indicator loadings, reliability and validity. In Table 3, none of the indicator loadings were below the acceptable limit and none of the variance inflation factor (VIF) values were below critical values, which is not an issue of multicollinearity.

Table 3. Factor Loadings and VIF

Constructs	Code	Loadings	VIF
Bias Blind Spot	BS1	0.817	1.71
	BS2	0.804	1.579
	BS3	0.857	1.512
Cognitive Dissonance	CD1	0.710	1.419
	CD2	0.668	1.252
	CD3	0.743	1.478
	CD4	0.683	1.362
	CD5	0.767	1.539
Framing Effect	FE1	0.714	1.280
	FE2	0.764	1.330
	FE3	0.689	1.208

	FE4	0.654	1.219
	LA1	0.829	1.371
Loss Aversion	LA2	0.705	1.266
	LA3	0.808	1.393
	OS1	0.694	1.357
	OS2	0.725	1.462
Outcome Satisfaction	OS3	0.78	1.609
	OS4	0.729	1.479
	OS5	0.753	1.522
	PA1	0.697	1.426
	PA2	0.681	1.385
Process Appropriateness	PA3	0.754	1.568
	PA4	0.742	1.623
	PA5	0.723	1.547
	PA6	0.712	1.507
	PR1	0.743	1.736
	PR2	0.71	1.620
	PR3	0.68	1.532
Process Rationality	PR4	0.752	1.726
	PR5	0.641	1.394
	PR6	0.752	1.785
	PR7	0.707	1.566
	PR8	0.755	1.794
	RA1	0.728	1.451
	RA2	0.768	1.541
Regret Aversion	RA3	0.724	1.443
	RA4	0.722	1.409
	RA5	0.71	1.435
	SC1	0.793	1.637
Sunk Cost Fallacy	SC2	0.72	1.410
	SC3	0.77	1.507
	SC4	0.834	1.754

Internal consistency reliability was determined because the Cronbach alpha and composite reliability of all constructs were over 0.70 in Table 4. The convergent validity was established with the AVEs of more than 0.50 and marginal cases are acceptable in the context of behavioral research.

Table 4. Construct Reliability and Convergent Validity (AVE)

Construct	Cronbach's alpha	Composite Reliability	AVE
Bias Blind Spot	0.773	0.866	0.683
Cognitive Dissonance	0.761	0.839	0.511
Framing Effect	0.665	0.799	0.499
Loss Aversion	0.685	0.825	0.612
Outcome Satisfaction	0.789	0.856	0.543

Portfolio Appropriateness	0.812	0.865	0.516
Process Rationality	0.865	0.895	0.516
Regret Aversion	0.782	0.851	0.534
Sunk Cost Fallacy	0.785	0.861	0.609

The HTMT ratios and the Fornell-Larcker criterion were used to confirm the existence of discriminant validity (see Table 5). All HTMT were less than 0.85, and diagonal AVE were more than inter-construct correlations, which proved construct distinctiveness.

Table 5. HTMT Ratios

	BS	CD	FE	LA	OS	PA	PR	RA	SC
BS									
CD	0.339								
FE	0.070	0.494							
LA	0.073	0.412	0.591						
OS	0.089	0.342	0.219	0.212					
PA	0.181	0.294	0.200	0.164	0.582				
PR	0.069	0.285	0.179	0.150	0.540	0.565			
RA	0.047	0.452	0.546	0.502	0.180	0.195	0.133		
SC	0.060	0.455	0.489	0.555	0.225	0.237	0.129	0.459	

Cross-loadings also helped in the discriminant validity because every indicator loaded maximally on its respective construct (see Table 6).

Table 6. Cross Loadings

	BS	CD	FE	LA	OS	PA	PR	RA	SC
BS1	0.817	0.179	0.006	-0.037	-0.049	-0.12	-0.057	-0.011	-0.037
BS2	0.804	0.21	0.033	-0.033	-0.005	-0.099	-0.001	0.016	0.019
BS3	0.857	0.26	0.065	-0.022	-0.085	-0.134	-0.054	0.042	-0.016
CD1	0.159	0.71	0.242	0.22	-0.236	-0.193	-0.187	0.269	0.23
CD2	0.219	0.668	0.254	0.207	-0.091	-0.119	-0.117	0.26	0.236
CD3	0.153	0.743	0.298	0.193	-0.191	-0.183	-0.217	0.272	0.286
CD4	0.191	0.683	0.207	0.183	-0.186	-0.11	-0.127	0.187	0.186
CD5	0.23	0.767	0.254	0.273	-0.239	-0.215	-0.176	0.261	0.32
FE1	0.041	0.238	0.714	0.327	-0.083	-0.074	-0.062	0.227	0.252
FE2	0.013	0.267	0.764	0.314	-0.108	-0.083	-0.105	0.338	0.296
FE3	0.051	0.245	0.689	0.242	-0.157	-0.123	-0.12	0.265	0.269
FE4	0.028	0.248	0.654	0.259	-0.099	-0.139	-0.097	0.283	0.189
LA1	-0.007	0.275	0.363	0.829	-0.157	-0.136	-0.117	0.334	0.356
LA2	0.017	0.203	0.26	0.705	-0.12	-0.075	-0.113	0.232	0.306
LA3	-0.086	0.225	0.315	0.808	-0.09	-0.065	-0.041	0.299	0.294
OS1	-0.049	-0.218	-0.067	-0.132	0.694	0.324	0.323	-0.094	-0.109
OS2	-0.021	-0.21	-0.137	-0.121	0.725	0.341	0.319	-0.092	-0.179
OS3	-0.002	-0.184	-0.11	-0.147	0.78	0.401	0.36	-0.174	-0.135
OS4	-0.051	-0.185	-0.16	-0.117	0.729	0.324	0.316	-0.111	-0.139
OS5	-0.101	-0.171	-0.113	-0.061	0.753	0.329	0.33	-0.037	-0.086
PA1	-0.137	-0.148	-0.092	-0.004	0.331	0.697	0.345	-0.087	-0.108

PA2	-0.088	-0.198	-0.145	-0.099	0.363	0.681	0.337	-0.139	-0.158
PA3	-0.06	-0.141	-0.144	-0.126	0.356	0.754	0.385	-0.088	-0.127
PA4	-0.134	-0.202	-0.078	-0.145	0.332	0.742	0.327	-0.131	-0.146
PA5	-0.112	-0.125	-0.063	-0.052	0.316	0.723	0.331	-0.126	-0.11
PA6	-0.096	-0.186	-0.099	-0.092	0.315	0.712	0.322	-0.099	-0.162
PR1	-0.02	-0.182	-0.151	-0.103	0.337	0.332	0.743	-0.122	-0.126
PR2	-0.012	-0.081	-0.083	-0.098	0.327	0.317	0.71	-0.069	-0.074
PR3	-0.04	-0.195	-0.118	-0.086	0.268	0.312	0.68	-0.083	-0.075
PR4	-0.017	-0.18	-0.086	-0.098	0.362	0.377	0.752	-0.101	-0.103
PR5	-0.042	-0.163	-0.054	-0.043	0.316	0.327	0.641	-0.102	-0.011
PR6	-0.032	-0.185	-0.079	-0.058	0.317	0.341	0.752	-0.02	-0.069
PR7	-0.066	-0.178	-0.112	-0.095	0.341	0.347	0.707	-0.068	-0.073
PR8	-0.039	-0.164	-0.099	-0.072	0.296	0.377	0.755	-0.051	-0.049
RA1	-0.006	0.198	0.208	0.253	-0.06	-0.04	-0.062	0.728	0.271
RA2	0.022	0.28	0.311	0.298	-0.135	-0.123	-0.085	0.768	0.285
RA3	0.014	0.212	0.339	0.274	-0.086	-0.127	-0.033	0.724	0.248
RA4	0.045	0.307	0.289	0.268	-0.088	-0.153	-0.108	0.722	0.289
RA5	0.007	0.283	0.296	0.271	-0.139	-0.12	-0.103	0.71	0.221
SC1	-0.066	0.277	0.278	0.376	-0.15	-0.134	-0.094	0.264	0.793
SC2	0.006	0.259	0.238	0.282	-0.164	-0.182	-0.06	0.262	0.72
SC3	0.02	0.268	0.261	0.293	-0.066	-0.089	-0.019	0.314	0.77
SC4	-0.005	0.304	0.338	0.321	-0.17	-0.182	-0.137	0.287	0.834

4.5 Higher-Order Construct Assessment (Stage Two – Disjoint Approach)

The two-stage disjoint approach was applied to estimate formative higher-order constructs. Findings show that all lower-order constructs have significant contribution to their corresponding higher-order constructs, which confirms the formative specification. In the case of Investment Decision Quality (IDQ), outcome satisfaction was the most dominant factor, followed by the portfolio appropriateness and process rationality (see Table 7). In the case of prospect related biases, sunk cost fallacy, framing effect and regret aversion had a more significant contribution, which validates the configurational and non-substitutable nature of the construct.

Table 7. Formative Measurement Model Results

HOC	LOC	Outer Weight	T Statistics	P Values	Outer Loadings	VIF
IDQ	PR	0.26	1.763	0.078	0.708	1.412
	PA	0.42	2.805	0.005	0.803	1.445
	OS	0.553	4.128	0	0.866	1.397
Prospects	LA	0.189	2.098	0.036	0.651	1.37
	RA	0.361	4.325	0	0.735	1.316
	FE	0.377	4.499	0	0.75	1.345
	SC	0.427	5.383	0	0.77	1.317

4.6 Structural Model Results

The results of the structural model give a high level of support to the hypotheses. Prospect-related biases significantly impact negatively on the quality of investment decisions and cognitive dissonance also influences negatively the quality of investment decisions. The effect

of prospect biases on cognitive dissonance is positive. Mediation analysis validates cognitive dissonance partly mediates the connection amid prospect biases and IDQ. Moreover, the effect of prospect biases on cognitive dissonance is greatly moderated by bias blind spot (see Table 8).

Table 8. Structural Model Results

Hypothesis	Relationship/Effect	Effect Type	β	t-value	P values	Result
H1	PROSPECTS -> IDQ	Direct	-0.137	2.635	0.008	Supported
H2	CD -> IDQ	Direct	-0.238	5.116	0	Supported
H3	PROSPECTS -> CD	Direct	0.463	14.687	0	Supported
H4	PROSPECTS -> CD -> IDQ	Mediation (Indirect)	-0.11	4.661	0	Supported (Partial)
H5	BS x Prospects -> CD	Moderation	0.11	3.157	0.002	Supported

4.7 Model Explanatory Power and Fit

The model has a reasonable explanatory power that explains 30.3 percent of the variation in cognitive dissonance and 10.6 percent in the quality of investment decision. The results of effect size analysis suggest that prospect biases have a powerful effect on cognitive dissonance in Table 9.

Table 9. Effect Size (f^2) Results

Description	R Square	t-value	P values
CD -> IDQ	0.049	2.452	0.014
Prospects -> CD	0.307	5.483	0
Prospects -> IDQ	0.016	1.168	0.243
BS x Prospects -> CD	0.021	1.48	0.139

Adequacy is also checked by model fit indices, where the values of SRMR are lower than acceptable limits, and hence, the model fits well (see Table 10).

Table 10. Model Fit Assessment (SRMR)

Description	Original sample (O)	Sample mean (M)	0.95	99%
Saturated model	0.017	0.018	0.024	0.028
Estimated model	0.019	0.02	0.027	0.03

4.8 SPSS-Based Forensic Analysis of Investor Behaviour

Although the PLS-SEM finding fulfills the structural relationships, the forensic analysis was done further to reveal the underlying behavioral patterns and diagnostic evidence. Eight profiles of investors were identified with behaviorally distorted investors (25.2%) and rational investors (23.3%) making the largest groups, with most investors occupying mixed behavioral groups (see Table 11).

Table 11. Investors' Profiles

Investor Profile Groups			
Profile Code	Profile Name	Frequency	%
0	Behaviorally Distorted Investor	136	25.2
1	Lucky Satisfaction Investor	53	9.8
2	Advisor-Dependent Investor	40	7.4

3	Passive/Guided Investor	52	9.6
4	Cognition–Behaviour Gap Investor	43	8.0
5	Hidden Portfolio Risk Investor	50	9.3
6	Expectation Distortion Investor	40	7.4
7	Rational Investor	126	23.3
Total		540	100.0
Investor Behaviour Groups			
Profile Code	Category	Frequency	%
0	Behaviorally Distorted	136	25.2
1–6	Mixed Behaviour Profiles	278	51.5
7	Rational Investors	126	23.3

The PR-PA-OS framework shows that the shortcomings of the quality of decisions are manifested under specific arrangements, which proves the formative conceptualization of IDQ in Table 12.

Table 12. Behavioral Profile Structure (PR–PA–OS)

Code	Profile Name	PR	PA	OS	Interpretation
0	Behaviourally Distorted Investor	Low	Low	Low	Weak reasoning, poor portfolio construction, dissatisfied with outcomes
1	Lucky Satisfaction Investor	Low	Low	High	Weak decisions but satisfied due to luck or temporary gains
2	Advisor-Dependent Investor	Low	High	Low	Portfolio acceptable but reasoning weak and dissatisfaction present
3	Passive/Guided Investor	Low	High	High	Good portfolio and satisfaction due to external guidance
4	Cognition–Behaviour Gap Investor	High	Low	Low	Good reasoning but poor portfolio decisions and dissatisfaction
5	Hidden Portfolio Risk Investor	High	Low	High	Rational thinking and satisfaction but structurally weak portfolios
6	Expectation Distortion Investor	High	High	Low	Rational decisions but dissatisfied due to unrealistic expectations
7	Rational Investor	High	High	High	Strong reasoning, appropriate portfolio, and satisfaction

The results of descriptive analysis based on the profile indicate that the greater the level of prospect bias, the lower the IDQ and higher the level of cognitive dissonance, which supports the findings of the structural model (see Table 13).

Table 13. Profile-wise Descriptive Statistics

Code	Profile Name	PROS Mean	IDQ Mean	CD Mean
0	Behaviorally Distorted Investor	3.230	2.320	3.186
1	Lucky Satisfaction Investor	3.060	2.765	2.928
2	Advisor-Dependent Investor	3.054	2.782	2.940
3	Passive/Guided Investor	2.943	3.174	2.707
4	Cognition–Behaviour Gap Investor	3.192	2.786	2.990
5	Hidden Portfolio Risk Investor	2.951	3.187	2.772

6	Expectation Distortion Investor	2.951	3.170	2.755
7	Rational Investor	2.980	3.640	2.711
	Average	3.065	2.968	2.900

Descriptive statistics of the IDQ items reveal that there is comparatively lower performance on the portfolio appropriateness and outcome satisfaction (see Table 14).

Table 14. Dependent Variable Descriptive Statistics

Construct	N	Min	Max	Sum	Mean	S.D
OS	540	1.20	5.00	1581.40	2.928	.690
PA	540	1.33	4.83	1570.33	2.908	.667
PR	540	1.25	5.00	1657.88	3.071	.672
IDQ	540	1.49	4.66	1603.20	2.968	.542

ANOVA results in Table 15, shows statistically significant differences across different investor profiles for prospect biases, cognitive dissonance, and IDQ, highlighting behavioral heterogeneity.

Table 15. ANOVA Results

Variable	F-Statistic	p-Value
PROS	4.198	0
IDQ	286.072	0
CD	7.02	0

Although the combined effects of prospect biases and cognitive dissonance on decision failure are emphasized by the Behavioral Distortion Index (BDI), these two factors have a significant and nearly equal impact on distorting decisions (see Table 16).

Table 16. Behavioral Distortion Index (BDI)

Construct	Mean	Total Effect on IDQ	Impact (Mean × Effect)	% Contribution
Prospect-Related Bias	3.065	-0.25	-0.766	49.56%
Cognitive Dissonance	2.9	-0.269	-0.780	50.46%
Total BDI	-	-	1.546	100%

Further review in Table 17, indicates that various biases influence various aspects of quality of decisions in different psychological processes. Moreover, Table 18 explains various biases and strength of their influences.

Table 17. Bias–IDQ Matrix

Bias	Effect on PR	Effect on PA	Effect on OS	Psychological Mechanism	Distortion Type
Sunk Cost	Difficulty admitting mistakes	Holding losing investments	Emotional discomfort from realized losses	Cognitive Dissonance	Behavioral & emotional
Loss Aversion	Risk perception dominated by fear of losses	Conservative portfolio adjustments	Strong negative reaction to losses	Cognitive Dissonance	Emotional
Regret Aversion	Hesitation in decision revision	Avoid selling losing stocks	Persistent regret after poor outcomes	Cognitive Dissonance	Emotional

Framing Effect	Decisions depend on gain/loss framing	Portfolio choice varies with presentation	Emotional reactions to framed outcomes	Cognitive Dissonance	Emotional

Table 18. Bias Impact on IDQ Components

Bias	Effect on PR	Effect on PA	Effect on OS	Explanation
Loss Aversion	Weak	Moderate	Strong	Fear of losses influences decisions
Regret Aversion	Weak	Weak	Strong	Emotional regret affects satisfaction
Sunk Cost	Moderate	Strong	Moderate	Investors hold losing assets
Framing Effect	Moderate	Moderate	Strong	Decisions influenced by presentation of outcomes

Table 19 presents the bias transmission mechanism identified in this study. It illustrates how bias may originate, pass through different stages, and ultimately influence outcomes.

Table 19. Bias Transmission Mechanism

Bias System	Bias Dimensions	Psychological Channel	Affected IDQ Dimension	Behavioral Effect
Heuristic Bias	Overconfidence, Anchoring, Confirmation, Herding	Risk Perception	Portfolio Appropriateness	Distorted portfolio construction
Prospect Bias	Loss Aversion, Regret Aversion, Sunk Cost, Framing	Cognitive Dissonance	Outcome Satisfaction	Emotional dissatisfaction
Both Systems	All biases	Cognitive processing	Process Rationality	Distorted reasoning

Lastly, the forensic framework exhibits the existence of layered distortions, namely cognitive, behavioral, and emotional, in influencing the rationality of processes, portfolio suitability, and outcome satisfaction, respectively

Table 20. Distortion Layer Classification

Distortion Layer	Primary IDQ Dimension	Explanation	Associated Biases
Cognitive Distortion	Process Rationality (PR)	Biased reasoning and information processing	Anchoring Bias, Confirmation Bias, Overconfidence Bias
Behavioral Distortion	Portfolio Appropriateness (PA)	Distorted portfolio allocation and trading behaviour	Herding Bias, Overconfidence Bias, Sunk Cost Bias
Emotional Distortion	Outcome Satisfaction (OS)	Emotional evaluation of investment outcomes	Loss Aversion, Regret Aversion, Framing Effect

4.9 Summary of Findings

Altogether, the findings have a solid empirical basis of the hypothesized moderated-mediation model. Prospect-related biases have a considerable negative effect on the quality of investment decisions, both direct and indirect, as a result of cognitive dissonance, and bias blind spot conditions this relationship. The combination of SPSS-based forensic analysis, in addition to these structural relationships, discloses that the weakness of the quality of decisions is not

accidental but organized in a structured pattern related to a particular profile of investors and layers of distortion. In particular, differences in process rationality, portfolio appropriateness, and outcome satisfaction allow diagnosing underlying behavioral weaknesses associated with prospect biases and dissonance mechanisms. The cumulative evidence suggests that the failure in making investment decisions are not only outcomes of the behavioral influences but also can be used as a forensic sign of underlying cognitive, behavioral, and emotional distortions. These findings demonstrate that investment decision failures are not random but structurally patterned, enabling forensic interpretation of underlying behavioral vulnerabilities.

5. Discussion & Conclusion

This paper investigated how prospect-related behavioral biases affect the quality of investment decisions having mediation process through cognitive dissonance and the moderating influence of bias blind spot factored in. In addition to providing support to hypothesized relationships, the results also provide a unique methodological and conceptual contribution in the form of empirical validation of a framework where both independent and dependent variables are formative second-order constructs, a configuration that has not been studied extensively in behavioral finance literature.

5.1 Second-Order Construct Configuration

One of the major contributions of the research is that the prospect biases and the quality of investment decisions are modeled simultaneously as second-order formative constructs. In general, the literature in behavioral finance has generally conceptualized biases as first-order-independent variables and evaluated the results based on performance or one-dimensional measures of satisfaction. By contrast, the present study frames prospect biases as a configurational phenomenon, which is collectively constituted by loss aversion, regret aversion, sunk cost fallacy and framing effects. In the same manner, investment decision quality is projected as a multidimensional evaluative variable, which is comprised of process rationality, portfolio suitability and outcome satisfaction.

The results of the formative assessment indicate that there are dissimilar dimensional contribution to the both higher-order constructs empirically supporting this specification. This conclusion is significant since it proves that prospect biases as well as decision quality (IDQ) cannot be effectively reduced to any single dimension without loss of explanatory power. By so doing, the study addresses longstanding gap in behavioral finance to shift from fragmented bias analysis to integrated behavioral configurations.

5.2 Discussion of Behavioral Mechanisms

The structural findings reveal that there is a strong negative direct impact of second-order prospect biases on the quality of second-order investment decisions. This suggests that the joint occurrence and interplay of several prospect biases, as opposed to a single bias alone, is the most potent cause of poor decision quality. This is a configurational effect that can be used to explain why investors tend to continue making poor decisions despite having sufficient market information.

More importantly, the results prove the existence of cognitive dissonance as one of the critical psychological transmission processes between these higher-order constructs. Prospect biases has a strong positive impact on cognitive dissonance, which in turn degrades the quality of investment decisions in terms of its process, portfolio, and satisfaction aspects. The observed partial mediation indicates that although prospect biases have a direct negative effect on the quality of decisions, a significant part of their effect is mediated by a psychological conflict that occurs during decision-making. This underscores cognitive dissonance as a mediating process by which the impacts of bias are converted into systematic decision failure.

The moderation outcomes also expand this description by demonstrating that the bias blind spot amplifies the influence of the prospect biases on cognitive dissonance. It means that

investors who fail to recognize their own biases experience high level of psychological conflict when exposed to prospect-driven distortions. However, the persistence of direct effects indicates that unawareness of biases further strengthens, rather than reduces, the behavioral consequences of deeply rooted bias configurations

5.3 Theoretical Implications

The paper is a valuable addition to behavioral finance in three significant respects. First, it supports a more advanced conceptualization of behavioral biases showing that prospect biases are not single anomalies but a combined behavioral force. Second, it improves the quality of investment decisions as a second-order behavioral implication, by redirecting focus on realized returns to the quality of decision making and judgment. Third, the study provides a process-based description of decision failure, which is complementary to but not substitutes traditional prospect theory by relating the two higher-order constructs via a cognitive dissonance process. Notably, the second-order to second-order causal structure that is used to test the hypothesis in this paper is rare in behavioral finance research. In empirically validating this structure through PLS-SEM, the study offers methodological advice to future studies aimed at testing the multidimensional results and complex behavioral configurations.

5.4 Forensic and Practical Implications

From forensic viewpoint, the formative structure of both prospect biases and decision quality can be reversed, so that the analysts and regulators could trace the observed weaknesses in decision quality back to the underlying behavioral sources. Ongoing weaknesses in the rationality of processes or the satisfaction of results, may indicate escalation caused by sunk cost behavior or regret aversion. This makes the quality of investment decision (IDQ) a useful behavioral diagnostic indicator, which can be used to identify investor vulnerability, unsuitable advice or behavioral exploitation.

For practitioners, the results indicate that improving investor output requires not only emphasize on correcting personal biases, but also to deal with psychological conflict and justification processes that arise when multiple biases are co-occurring. Pre-commitment mechanisms, bias-awareness training, and structured decision frameworks might be used to alleviate the severity of dissonance and enhance the quality of decisions in a holistic manner.

5.5 Limitations and Future Research

In spite of its contributions, the study has flaws. The cross-sectional design limits the strong causal inference and relying on self-reported measures may show perceptual biases, as responses of participants may not fully reflect their actual behaviour. Future studies may use a longitudinal or experimental design to investigate the longitudinal changes in second-order bias configurations and the change in cognitive dissonance across decision cycles. Other possible mediators or moderators are also testable in a study, e.g., emotional regulation or advisory trust, but in similar higher-order models.

These results ought to be viewed under some boundary conditions. The framework can best serve the individual investors, whose process of psychological conflict and justification is more relevant. Formal decision protocols and accountability structure may reduce the degree of cognitive dissonance experienced by institutional investors or algorithmic trading systems. Future studies can also apply the framework to various types of investors to determine the strength of the hypothesized behavioral processes.

5.6 Conclusion

Finally, this paper is a strong empirical investigation that second-order prospect biases directly and indirectly reduce the quality of second-order investment decisions by the influence of cognitive dissonance. The study advances behavioral finance by modelling the two constructs at high-order level, moving beyond testing individual biases to an integrated, process-based

perspective of decision failure. The results provide a good basis on which future behavioral, forensic, and regulatory studies can be conducted to enhance the quality, rather than the output, of investment decision-making. This study offers a basis of diagnosing and alleviating failures of investment decisions at an early stage before they translate into financial damages by replacing the outcome-based evaluation with behavioral diagnostics. This forensic perspective advances behavioral finance toward a preventive, diagnostic and policy-relevant approach.

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