

A Behavioral Systems Theory of Investor Decision-Making under Market Stress: A Narrative Analysis of Interacting Behavioral Biases

Aderemi Aborode

College of Business and Management Studies, Texila American University, Guyana

Correspondence to be addressed: E-mail - remi.aborode@gmail.com

Cite this article as: Aderemi Aborode. A Behavioral Systems Theory of Investor Decision-Making under Market Stress: A Narrative Analysis of Interacting Behavioral Biases. Texila Int J Psychol. 2026;5(1).
<https://doi.org/10.21522/TIJPY.2016.05.01.Art002>

Received:28.07.2026

Accepted:08.09.2026

Published: 29.09.2026

Article Type: Original Research

Abstract Psychological biases affecting investor behaviour in financial markets have gained traction over the years but little has been published about their interactions when uncertainties arise. This paper proposes a theoretical Behavioral Systems Theory (BST) of investor behaviour as a complex system defined by the cognitive, emotional and social behavioral finance biases, particularly loss aversion, overconfidence effect, anchoring bias, herd behaviour and systems theory is employed to understand cognitive dissonance and bias during economic turmoil. Qualitative narrative methodology is used to study the outcomes of investor behavior during the Global Financial Crisis of 2008, COVID19-induced market crash and speculative post-pandemic growth (2021-2025). Combination theory provides the basis for hypothesizing the numerous structural interaction possibilities for the bias system: at most six for two-way, four for three-way interactions and one for four-way interactions. Investor irrationality as revealed by the interactions functions as a feedback-loop system exhibiting recurring cognitive dissonance, emotional and social bias. Its effects are observable in the forms of speculative bubbles, panic-selling, procrastinating recovery, volatility expansion, clustering of trading activity and financial contagion. BST yields new contribution to behavioral finance as a system theory and a discovery of the dynamics that govern investor behavior during uncertainties. This theory also has practical implications for investors allocating to different asset classes, financial institutions, regulators and policymakers in maintaining order in the financial system, professional financial advisers to their clients. Quantitative and mixed-method research design is prescribed for future testing of the BST theory.

Keywords Anchoring, Behavioral Systems Theory, Herd Behaviour, Loss Aversion, Narrative Methodology, Overconfidence.

Introduction

The financial markets, playing an important role in the economic growth of a country, reallocates the available resources, transfers the financial risks, and generates the wealth for the nation. Financial economists over decades have built their theoretical models on the assumptions of rationality provided by investors who extract data out of the received information efficiently and decide to maximize the expected utility. These assumptions lay the groundwork of traditional financial theories such as Efficient Market Hypothesis (EMH) and Modern Portfolio Theory (MPT). Efficient Market Hypothesis believes that the security prices reflect all available information and information is efficiently processed. Hence, consistently outperforming the market to realize positive abnormal returns become almost impossible due to outperformance based on effective research or forecasting for future events from an investor to another [1]. Likewise, the Modern Portfolio Theory posits that the rational investor optimally assembles their portfolios to maximize the expected return at every level of risk based on dividing their investment funds across different asset classes and implementing the optimization procedures [2]. Nonetheless, these theories (which are fundamentals of the financial economics) have been increasingly criticized for their apparent inability to account for recurrent episodes of instability and irrationality in the markets. Documentary evidence have shown that investors usually do not behave as predicted; that is, they do not always adhere to rational choice and utility maximization principles. The most recent price bubbles and major financial crises such as the Dot-Com Bubble (late 90s), the Global Financial Crisis (2008) and the COVID-19 market crash (2020) were described by incautious and over-optimism behavior of investors, panic selling, speculative trading and herd behavior – all the phenomena that are

hard to fit into the traditional financial model [4, 9].

The broadly known Dot-Com Bubble is one of the first and most conspicuous examples of irrational market behavior in modern financial history. At that time, the extreme optimism of investors regarding internet IT companies with dubious and often no earnings allowed inflating the investment valuations of such enterprises to unprecedented heights. The overly heated-enthusiasm about digital technology developments spread in the markets and beyond fostered never-before-seen speculative investments. When the market reality disillusioned investors with overly optimistic prospects, the severe depreciation of corresponding assets ensued, leading to considerable economic losses. Emphasizing irrational market behavior, existing theories could not explain how thousands of investors had disregarded valuation principles for such a long time. Global financial crisis in 2008 likewise highlighted extreme shortcomings in the traditional financial theory. Prior to the crisis, overconfidence in the housing market, financial innovations, risk management and more led to extreme speculation by investors and financial firms. Confidence began to erode quickly, leading to panic selling in the housing market, a loss of confidence spreading to other financial institutions and creating a contagion in the market, and systemic instability. The crisis had shown that investors are subject to human behavioral, psychological, and emotional biases that may have negatively influenced their decisions besides just economic factors [14]. The role of behavioral effects in financial markets gained even additional attention during the COVID-19 pandemic. Global financial markets faced unprecedented volatility due to investors' response to the uncertainties of the public health threat, the prospect of the economic slowdown, and government policies to address these uncertainties. The abnormal price swings

in financial markets during that time were driven not only by economic fundamentals but also by emotions, the uncertainties in the evolving story on the prospects of the global economy. These developments reemphasized the understanding that the investors' behavior cannot be explained only using the rational-choice theory [17, 18].

There were some limits of classical finance which led to the emergence of and continually growing fame of behavioral finance. Behavioral finance contains the cognitive and psychological features that influence how individuals make financial decisions under uncertainty. Behavior finance assumes that investors don't rely on perfectly rational reasoning. Their decision-making is influenced by various cognitive distortions, emotional upheavals, societal influences, and automatic judgments or thought processes that affect reasoning and decision-making systematically [4, 8, 9, 16]. The behavioral biases most commonly discussed in the literature include loss aversion, overconfidence, anchoring, and herd behavior. Loss aversion is a behavioral bias that describes the tendency of people to experience losses stronger than symmetric gains, leading the investor to prefer to avoid losses rather than making profit and be risk-averse in uncertain situations [4]. Overconfidence is an excessive overestimation of one's intuition, prediction ability and capability to make price moves predictions, which results in excessive trading and speculation [7]. Anchoring describes the tendency of people to interrelate the decisions taken with the first information or certain point of reference, even when the information that changes the situation appears later [3]. Herd behavior describes the tendency to follow the behavior of the rest of the investors and not to analyze independently during uncertain and stressed market situations [5].

Much literature had been published regarding the identified behavioral biases; however, most of these studies looked at the

biases in isolation. The loss aversion, overconfidence, anchoring, and herd behavior were mostly diagnosed and analyzed as independent from each other. But in reality, and most of the time, not just one bias is influencing an investor's decision-making behavior. It should be noted that after the recent economic crisis, investors are probably affected by several combined psychological, emotional, and social influences. Thus, studying each bias independently might not provide a more detailed and clearer understanding of how behavioral biases could influence investors' decision-making in uncertain market environments.

Emerging behavioral finance research has provided evidence that irrationality of investors is a result of interplay of numerous behavioral biases rather than the isolated operational effect of each bias on its own [20-24]. Individual investors facing a loss can be anchored to the prior value of their portfolio, exhibit herd behavior to seek social confirmation, and overconfidently believe they are able to predict the recovery of the asset value. As a result, these combined elements create a vicious feedback system where the joint behavior becomes disproportionate to the prediction of the single-bias system. Likewise, increasing complexity of current financial markets also reinforces the need to study behavioral interactions. The investment landscape has fundamentally changed with the appearance of new digital technologies, algorithm-based trading systems, social media, online trading and investment platforms, and widespread instant availability of information. Information has become ubiquitous and spreads faster than ever, allowing emotions, ideas, and general optimism or pessimism to propagate via the herd influence among large numbers of investors within a short period of time. These phenomena have raised the risks of behavioral contagion, speculative bubbles, and correlated dynamics of financial markets much further [20, 21].

The aim of this study is to respond to these changes in environment by proposing a Behavioral Systems Theory (BST) of investor decision-making under market stress. The core idea of the proposition is that investor decisions can be considered as a behaviour system consisting of cognitive, emotional and social biases. Instead of viewing behavioral biases as isolated psychological distortions, BST argues that investor behavior is not a result of any single cognitive distortion, but a multidimensional interactive effect of loss aversion, overconfidence, anchoring and herd behavior. This study will make use of the principles and ideas from behavioral finance, complexity theory, narrative economics and combination theory in order to provide a novel and more realistic explanation of an investor behavior in times of economic crisis.

Core Research Question

How do interacting behavioral biases influence investor decision-making and investment strategy during periods of economic crisis?

Objectives of the Study

1. To examine the interaction among loss aversion, overconfidence, anchoring, and herd behaviour during economic crises.
2. To develop a Behavioral Systems Theory explaining multidimensional investor irrationality.
3. To apply combination theory in identifying possible interaction structures among behavioral biases.

Basic Assumptions

1. Investor behavior during crises is influenced by multiple interacting biases rather than isolated psychological tendencies.
2. Economic crises amplify emotional and cognitive distortions due to uncertainty and volatility.

3. Narrative methodology is appropriate for understanding investor interpretation of crisis events.

Limitations of the Study

The study adopts a conceptual and narrative approach and therefore does not include empirical testing. The analysis focuses primarily on four dominant behavioral biases and may exclude other relevant psychological constructs such as confirmation bias or mental accounting. Furthermore, crisis narratives may vary across institutional and geographical contexts.

Review of Related Literature

Behavioral Finance has been one of the significant advances in the evolution of financial economics over the past 50 years. It has emerged to explain the phenomena that existing financial theories could not accommodate; still many investors are trapped into irrationality, speculative bubbles, market crashes, over and under reaction, excessive volatility and the financial contagion. Behavioral Finance assumes that unlike traditional financial theories, which assume that investors are rational and their actions maximize utility through rational processing of information, there is plenty of evidence describing that the investor is influenced by cognitive biases, emotional response, and social influence and interaction [1, 4, 9]. Behavioral finance theory is used to justify the study of evolution and dynamics of the perception of the financial decisions of investors. Due to psychological biases, investors do not follow rational expectations, which also systematically distort both the perception and processing of information, risk perception and investment decision-making. Behavioral finance theory has fostered situations in which the investors' behavior deviates from the conventional financial theories predictions.

Despite the evident advances since the understanding of the investors as behavioral finance, the literature still presents itself poorly integrated. Most of the studies deal with the behavioral bias in an isolated manner – more central or less in a specific cognitive error: loss aversion, overconfidence, anchor, herd effect, etc. Despite the importance of this perspective as an explanatory centrality, this dispersion often does not allow us to understand how a set of biases put together intervene simultaneously in complex financial situations. This is even more aggravated in days of financial turmoil when so much uncertainty, fear, social pressure and over-information push the behavioral biases to the extreme. It therefore important that behavioral biases should be considered in an interrelated manner. Recent developments in behavioral finance, theory of complexity and theory of narrative economics postulate the premise that the behavioral finance should rather be seen as a multidimensional behavioral finance phenomenon than merely a behavioral finance anomaly - where cognitive, emotional and social mechanisms interact and collude in a systematic manner to influence the investor behavior and decisions [6, 17, 18].

Traditional Finance and the Rational Investor Paradigm

The traditional finance theory is founded on the assumption that investors' behavior is rational and the information is processed efficiently by the markets. The Efficient Market Hypothesis, proposed by Francis Fama [1, 19], states that the asset pricing reflects all the information that is available in the market. This implies that there cannot be consistent gains by the investors, as the information will be included in a timely manner to the level of the prices of the securities.

Modern Portfolio Theory (MPT) applied by Harry Markowitz [2] also assumes that the rational investor will make optimal choices for constructing a portfolio on the basis of the

trade-off between expected return and risk. It is further assumed that investors can objectively evaluate the choices available to them and select the alternative portfolio that provides them the maximum utility for a given level of risk. Grounded in the rationalists' perspectives, many of the modern financial theories have been developed. This includes theories about portfolio management, asset pricing, corporate finance, and risk management. However, many of these theories have been increasingly questioned since certain systematic anomalies have been demonstrated which deviated from rationality.

The traditional finance theory is highly criticized for its failure to consider any plausible theories for speculation bubbles and market crashes. The discovery of market crash during the dot-com bubble in which investors continued buying technology stocks with weak fundamentals and positive return was hard to comprehend in view theory. This was also true when investors and institutions ignored evidences of unstable housing and credit markets during the global financial crisis with collective underestimating of risks. It was easy for market players to assume rational expectations and precise conveyance of information [14]. The foremost argument of the critics against the established models is that these models consider human behavior too simplistic, as it considers that humans hold super rationality; people have perfect knowledge and always take the best decisions. People, however, invest under unpredictable circumstances with lack of information, pressure of emotions and social contexts, which render them prone to systematic errors in judgment and decision making [4]. It is therefore the shortcomings of classical finance that formed the intellectual basis for the emergence of the emerging paradigm of behavioral finance.

Emergence of Behavioral Finance

The areas of accomplishments of behavioral finance are economic theory with a deep influence of psychology. The efforts of Daniel Kahneman and Amos Tversky signify a great step forward in verifying that the choices of any group of individuals are not exclusively in accordance with the rational decision hypothesis [3, 4]. Heuristics and cognitive biases are described by the researchers on how people made their decisions in the uncertainty situation. Cognitive bias as a decision – making heuristic makes it easier for people, however, the researchers also identified the systematic errors that cognitive bias brought out to the risk and payoff judgment.

The development of Prospect Theory was an important breakthrough in understanding how our brains work while making investment decisions [4]. This theory opposed expected utility models by showing that individuals make decisions not according to their wealth level, but according to gains and losses relative to a reference point. The theory also suggests that the impact of losses has a more pronounced effect on decision making as compared to the same valued gain; the treatment of positive and negative outcomes is therefore asymmetric prospectively. Stemming from behavioral economics, Prospect Theory revolutionized financial decision-making research as it provided a psychological explanation for many market anomalies. Investors were not the optimal rational agents, but rather bounded rational agents perceiving and overreacting to diverse emotions and cognitive biases. With subsequent work, Richard Thaler made significant studies on mental accounting, how things are framed for the individual, and the concept of bounded rationality [8]. His work significantly proved that human economic decision-making was directed by the perception of information rather than economic values.

The qualitative element of the research emphasizes the role of behavioral finance, which has become an established area of research with an ample amount of empirical evidence. The behavioral finance empirical evidence links the established biases to excessive trading, speculative bubbles, under-diversification, market overreaction, momentum, and financial contagion [7, 9]. Nonetheless, there is a major limitation in the literature surrounding behavioral finance. Most published papers are focused on prediction and measurements of different types of the individual biases influencing the decision-making process, consequently the methods and tools used to evaluate the relationships between them are missing. Thus, behavioral finance examines the investors' psychology as independent biases instead of nonlinear behavior.

Theoretical Foundations of Behavioral Systems Theory

The Behavioral Systems Theory (BST) is built on the synthesis of four theoretically sound frameworks-Prospect Theory, Behavioral Finance Theory, Complexity Theory and Narrative Economics. Prospect Theory offers an emotional basis of BST as it explains how decision-makers assess gains and losses against reference points and loss aversion impact is greater than corresponding gain impact [4]. It helps to understand how loss aversion affects irrational investor behavior in times of uncertainty and market recession. The Behavioral Finance Theory forms the cognitive emotions of BST and provides systematic cognitive prejudices such as overconfidence and anchoring which distort the perception of market information, risk perception, and financial decision-making [3, 7, 9]. Both theories deny rationality assumptions of classical finance, proving that investor decisions are influenced by psychological factors rather than economic realities alone.

Besides individual level, Complexity Theory and Narrative Economics could explain behavioral influence in financial systems. Complexity Theory defines financial markets as complex adaptive systems that operate in nonlinear feedback loops, are emergent in structures, and contain dynamically complex interactions among agents, or market participants [6]. In accordance to the complexity theory, financial systems outcomes are influenced more by interplay between many behavioral determinants than just one singular determinant. Narrative Economics also explains the behavioral determinant of stories, beliefs, and expectations that are formed and transmitted socially, in which investors and market agents behave according to pre-held ideas or beliefs [17, 18]. Financial narrative could affect investor pool sentiment, produce shared reference points, positively or negatively boosts market player confidence and fear, and create high tendency to mimic other player's actions, or herding. Combining the four theories, it is hypothesized in Behavioral Systems Theory that investors' decision making in financial crises and uncertain economic climate is asystem of interrelated emotional, cognitive, and social influences.

Behavioral Biases and Their Interactions in Financial Decision-Making

Loss Aversion and Investor Behavior

The loss aversion theory is one of the best known in behavioral finance and was studied under the Prospect Theory. It states that people are affected more by the losses than by the increases of the same magnitude [4]. This asymmetric function of the theory takes the investor's profile to a more prejudiced and certain loss issue, contrary to the economist's line of rationality. In the financial market, the loss aversion theory influences all stages of the investor's portfolio construction, asset

allocation, risk perception and eviction, and is more significant in periods of uncertainty. When faced with a loss situation, the investor usually does not proceed with an eviction process just for the sake of admitting that the result is unfavorable. The theory defends that the investor retains the non-appreciated assets for a much longer period than would be expected by market fundamentals [4, 15].

However, loss aversion is not only relevant for individual financial decision making, but its scope increases in uncertain times when the market is volatile. Fear and uncertainty usually accompany financial crises and as a result of loss aversion, investors are more sensitive to losses and shun riskier assets. Previous literature has explored relationships between loss aversion and other phenomena such as panic selling, reluctance to portfolio rebalancing, overreaction to negative news in down markets, etc. [20-24]. There is ample evidence from empirical research supporting the effect of loss aversion in financial decision making, though numerous studies still investigate the bias in isolation, addressing only a small piece of the assessment of how emotional responses and their interactions with cognitive and social factors affect an investor's decision making process.

Overconfidence and Excessive Risk-Taking

Overconfidence refers to an investing bias where investors tend to overestimate their knowledge, forecast accuracy and ability to predict market movements [7]. According to overconfidence mechanisms, investors believe to possess some information, or they comprehend data better than the average market participants. Overconfident traders tend to trade excessively, underestimate risk and hold strongly biased beliefs regarding investment outcomes. Numerous empirical studies support findings that overconfident trader trades more excessively than confident trader and has lower returns due to higher transaction costs and decision errors [7, 25].

Overconfidence bias tends to be more prominent during bull market conditions, when increasing prices of assets contribute to feeling of increased competence and ability to successfully predict the future of some financial tools. Market participants may feel like they got lucky when their decision making leads to profits and brush off the losing decisions by attributing them to the “short term” or external circumstances. Overconfidence, therefore, encourages market participants to engage in further speculation and risk-taking behavior, ultimately leading to the formation of financial bubbles themselves [17, 18]. However, despite the available evidence, research on the overconfidence bias and its co-existence with other biases, particularly during periods of increasing uncertainty and emotional turmoil, still barely scratches the surface.

Anchoring and Cognitive Rigidity

The second one is anchoring, which refers to the mental habit relating to disproportionate weight of the first price or benchmark used to make further assessments regarding the prospect of the investment - stock price acquired, high and low values from the past, price estimates from analysts or simply the previous price of a portfolio. The investor used to get back to the previous reference to assess whether the future of their investment will payback even when there is evidence that this reference is no longer valid. Anchoring leads to mispricing, delay and resistance to change in the stock market [22, 23].

Also, the anchoring role in market persistence comes from a wider phenomenon of cognitive rigidity. An investor anchored to previous expectations is not able to adapt to a new perspective, even in the face of a change in the economic climate and basic values of the asset. Cognitive rigidity can cause serious consequences in a crisis. More recent studies are indicating theories about the anchorage that affect groups more than individuals and is

promoted by media headlines, consensual thinking and socially shared expectations [22, 23]. So, anchoring is not a cognitive bias but a social bias that enhances the persistence of mispricing and delays the adjustment.

Herd Behavior and Collective Decision-Making

Herd behavior/herd mentality is when an individual follows what majority of others do instead of taking an independent assessment of the situation [5]. An investor will assume that the majority are better informed than he is and therefore will follow market trends even if these are against all rational judgment. The informational cascade theory states that an individual will discard his private information in favor of the signal observed by the majority, especially when uncertainty is high [5]. Numerous studies have identified herding behavior among retail/institutional investors and such a tendency significantly correlates with co-movements and volatility in the market.

Emerging financial technologies relate to herd behavior in the market, particularly in terms of its theory. The fast spread of information from social networks, online identities, and financial influencers can stir narratives, emotions, and sentiments, growing rapidly in the investor community [20-24]. In terms of the current hype, the “crypto mania” and “meme stock trading” can demonstrate how herd behavior can impact the “buying” decisions much more than any visible indicators of financial soundness. However, despite its relevance, the study of herd behavior as a part of the social network analysis paradigm requires more connections with cognitive and affective biases, especially focusing on the role of behavioral contagion in financial market phenomena during instability (financial) crises.

Comparative Analysis of Behavioral Biases

Loss aversion, overconfidence, anchoring, and herd behavior are different but related facets of the investor's mental makeup. Loss aversion refers to the tendency of investors to weigh losses more than equivalent gains in their decision making. Overconfidence refers to the cognitive trait of over-estimating one's own market acumen [4, 7]. Anchoring affects the interpretation of new information as it refers to the tendency of the investor to base new knowledge on the current information [3, 5]. Herd behavior showcases the tendency of investors to obey their social network in making stock brokering decisions. However, all of these factors show instances where investors deviate from the rationality rule and succumb to emotional, cognitive, and social pressures.

Even so, there is a great level of overlap between the biases despite their theoretical differences; loss aversion may be influenced by anchoring, in the sense that the investors are influenced by the value of their portfolio prior to the effect; overconfidence may be influenced by herd behavior, in the sense that the investor is led to believe their belief stronger due to social consensus. Moreover, anchoring may be influenced by loss aversion, in the sense that the loss associated with the reference point is given more prominence; herd behavior may be influenced by optimism and fear, in the sense of social contagion. In this context, it appears that behavioral bias – if at all present – works along with one another to provide an additional layer of influence over the investment decision.

Emerging Evidence on Behavioral Interactions

Importantly, fresh discoveries in the behavioral finance have unveiled that instead of isolated psychological distortions the behavior of the investors is a result of a more complex landscape of biases [20-24]. Some of

the studies have analyzed the emotional, cognitive and social biases during the uncertain times in the market and concluded that the self-reinforcing feedback mechanisms have linked those biases with each other. For example, the loss aversion of investors, during bear market periods, possesses a powerful anchoring bias while the blindfolded optimism and herd behavior during Bull market periods threatens speculating investors. The interaction of those biases may lead to even more different results compared to those supported only by single bias.

With the creation of digital financial ecosystem, the channels for information and idea sharing, story-treading, and building of investor sentiment have become even more accessible and broadened. The recommendations based on algorithms and the exposure on social network and online forums allow for the spread of behavioral contagion across various groups of investors to happen more quickly and at larger scale [20-24]. While the recognition of the impact of these biases have increased, there is yet a literature that combines the different biases to create a framework for the interplay and effect on crises, therefore the development of a Behavioral Systems theory that analyzes stock market behaviour as a system with emotional, cognitive and social biases may be appropriate.

Critical Evaluation of Existing Literature

Overall, the literature reviewed illustrated how behavioral finance has expanded knowledge of the disregard of rationality among investors. The concepts of loss aversion, overconfidence, anchoring, and herd mentality have provided substantial evidence that investor decision-making processes are heavily influenced by psychological, emotional, and social factors [3, 4, 7, 9]. It also has supported explanations of various market inefficiencies such as overtrading, speculative bubbles, underreaction and

overreaction to information, and financial contagion. Moreover, Narrative Economics and Complexity Theory have also contributed to market knowledge by further indicating the role of investor beliefs, market narratives, and adaptive interactions on the behavior of markets [6, 17, 18]. Overall, the theories provided have successfully articulated the foundations for the neglect of rationality, while also supporting the role of psychological influences in the financial market.

Nevertheless, the current literature still has its significant drawbacks. The behavioral finance studies are still mostly reductionist in their nature, investigating behavioral biases as mutually exclusive independent determinants of marketplace and individual investor behavior [20-24]. Such approach cannot allow the researchers and practitioners to understand that an investor could be affected by a bundle of behavioral biases at the same time, emotion, information overload, social contagion, hubris, basic fear, and many others, and especially during crisis times characterized by uncertainty. Furthermore, the existing behavioral models explain individual behavior, while they cannot provide justification of how cognitive, emotional, and social influences operate through feedback loops for larger markets. Digitalization of financial operations, the emergence of social media, digital investment networks, algorithm-driven information flows facilitate behavioral contagions and collective behavior more than ever, and our existing theories do not allow explaining such processes adequately [20-24]. Finally, the existing behavioral models have low explanatory power to understand high perturbation events and crises in financial markets.

As a result of this close study of the literature, the theory and the concept gap emerge is an understanding of the interplay among behavioral biases in relation to the actor's financial decisions. While loss and overconfidence, anchoring, and herd behavior

have been demonstrated in earlier studies, very few studies have simultaneously examined the interaction of behavioral biases in crisis conditions and their impact on investor behavior [20-24]. Current behavioral finance theories do not have a mechanism to explain how emotional, cognitive, and social influences may impact each other through a feedback loop. Such effects include speculative bubbles, panic sales, non-recovery of the market, excessive volatility, and financial contagion. In addition, the rapid spread of the impacts of digital communication technology - such as the evolution of market narratives that affect the dynamics in the markets - point to a new way for interaction and the spread of behavioral biases. There are still many paths for these digitalized influences in terms of the impact of behavioral bias and isolate-bias approaches have shown their limitations. The approach proposed by this study takes into account this integration and introduces Behavioral Systems Theory (BST) as an alternative theory and a system approach framework that integrates the theory of behavioral finance including Prospect Theory, Complexity Theory, Narrative Economics, and Combination Theory. BST intends to explain the behavior of the investor's actions as part of the interconnected behavioral system that occurs in conditions of economic uncertainty and market stress.

Methodology

Philosophy, Design and Approach

This study adopts an interpretivist research philosophy combining inductive qualitative research as a means to propose BST. The research design opted for the narrative inquiry technique to critique the interacting role of loss aversion, overconfidence, anchoring and herding behavior in times of economic distress and market uncertainty. The data collection process employed secondary data compilation from peer-reviewed journal articles, seminal

books and publications reports, documentation depicting the history of financial crises, behavior narratives from institutions and archetypal files on the Dot-Com Bubble, Global Financial Crisis, the collapse of the market from COVID-19 and speculative post-pandemic developments. The approach for data analysis employed narrative synthesis of the reviews and critiques and behavior narratives from economic and market crises to identify recurring patterns and interactions among the four biases. The arguments revealed through the narrative analysis informed the development of BST. To ensure methodological rigour, the research employed triangulation of sources, clear strategy of the analysis and the five qualitative trustworthiness standards of credibility, dependability, conformability and transferability. In terms of ethics, there was no involvement of human participants and no requirement for ethical approval.

In this regard, the qualitative narrative inquiry methodology is appropriate for the research questions because it aims to understand interactions among behavioral biases in a situation of crisis in complex and uncertain financial markets. Ultimately, behavioral finance research has used quantitative approaches – surveys, experimentations, and econometric models – to explain individual behavioral bias and its influence on the investment decision process [4, 7, 9]. While this body of work has expanded knowledge on the psychology of investor behavior, it typically isolates a behavioral variable in an econometric model and lacks an appreciation of the complex, dynamic, and interrelated context in which investors make decisions during financial crises. The defining features of financial crises are uncertainty, evolving information, emotional responses, contagious behavior, and time-dependent processes. These characteristics make the narrative inquiry methodology particularly suitable because it

aims to understand how persons and groups make sense, create meaning, and adapt to changing situations through stories and shared experiences [10-13]. Also, the Narrative Economics perspective on the influence of narrative on financial markets suggests that informed belief and expectation now determine investor behavior instead of facts and information [17, 18].

In a theory-building perspective, the current behavioral finance constructs cannot fully explain why multiple biases happen at the same time during a stressful market situation. Furthermore, Complexity Theory suggests that market phenomena do not result from isolated variables but rather from connections and nonlinear interactions across agents [6], reinforcing the preference of an inclusive approach. Thus, an interpretive and theory-building approach can successfully demonstrate interaction patterns of behaviors and suggest an explanation with broad reach. The results of the synthesis from behavioral finance, crisis narrative, complexity theory, and narrative economics aim at an increase in understanding of investor behavior and the foundations of a theoretical model that future empirical tests of the Behavioral Systems Theory [6, 17, 18, 20-24] may be based on.

Combination Theory of Behavioral Bias Interaction

A distinctive feature of this study is the application of Combination Theory to systematically identify all possible interaction structures among the four focal behavioral biases: loss aversion (L), overconfidence (O), anchoring (A), and herd behavior (H). Using the combination formula:

$$nC_r = n! / (r!(n - r)!)$$

Where:

- (n) = total number of items
- (r) = number of items selected
- (!) = factorial

This formula calculates the number of possible combinations of (r) items selected from (n) items without considering order as follows.

- 2-way interactions:

$$4C2 = 4!/(2!(4-2)!) = 6$$

- 3-way interactions:

$$4C3 = 4!/(3!(4-3)!) = 4$$

- 4-way interactions:

$$4C4 = 4!/(2!(4-4)!) = 1$$

The analysis generated six two-way interactions, four three-way interactions, and one four-way interaction, resulting in a total of eleven unique behavioral interaction structures.

Figure 1 illustrates the derivation process.

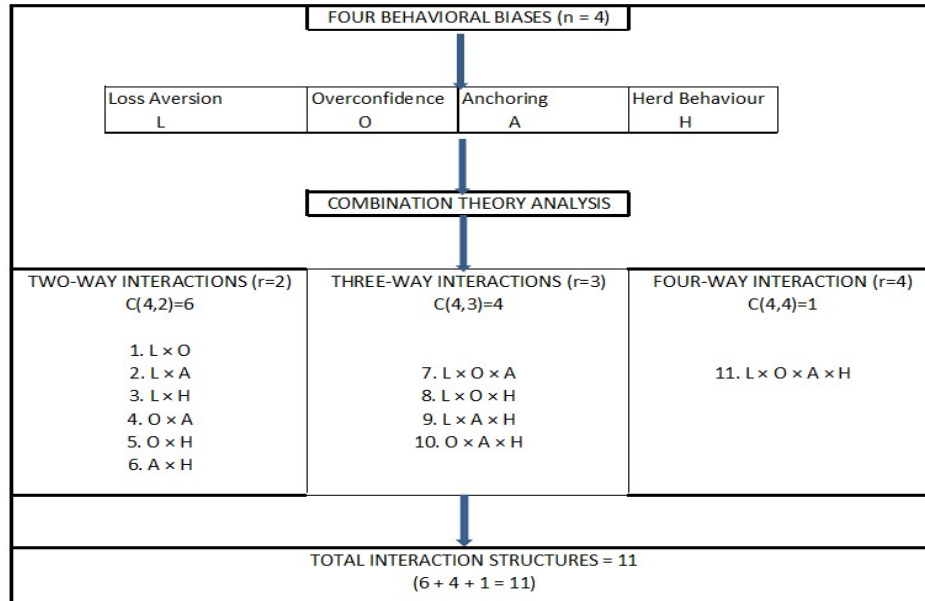


Figure 1. Combination Theory Analysis of Biases

Source: Developed by the Author

Summary of the Result

The loss aversion with overconfidence, anchoring, and herd behavior's interplay during the time of economic crises and bearish markets is analyzed. This results show that investor irrationality arises from behaviour individual alone, but recursive interactions

between emotional, cognitive and social (visible). This interactions developed behaviour amplification mechanism that leads to speculate bubbles, panic selling, long-recovery, overlearning, extreme volatility and financial contagion. Table 1 shows the interactions of the four behavioural biases.

Table 1. Behavioural Interaction Matrix

No.	Interaction Type	Bias Combination	Core Behavioral Effect	Likely Investment Outcome
1	Two-way	Loss Aversion × Overconfidence	Excessive risk-taking followed by fear of realizing losses	Holding losing assets too long
2	Two-way	Loss Aversion × Anchoring	Investor anchors to purchase price or previous high and avoids accepting loss	Delayed selling; portfolio rigidity

3	Two-way	Loss Aversion × Herd Behaviour	Fear of loss pushes investor to follow the crowd	Panic selling; market contagion
4	Two-way	Overconfidence × Anchoring	Investor over-trusts initial judgment or forecast	Slow adjustment to new information
5	Two-way	Overconfidence × Herd Behaviour	Investor believes they are independent while following market sentiment	Speculative trading; bubble formation
6	Two-way	Anchoring × Herd Behaviour	Collective market narratives become shared reference points	Valuation persistence; delayed correction
7	Three-way	Loss Aversion × Overconfidence × Anchoring	Investor takes risk, anchors to original belief, then refuses to realize loss	Disposition effect; prolonged losses
8	Three-way	Loss Aversion × Overconfidence × Herd Behaviour	Confidence-driven speculation turns into collective fear during crisis	Boom-to-panic reversal
9	Three-way	Loss Aversion × Anchoring × Herd Behaviour	Investors collectively anchor to past prices and fear selling at a loss	Clustered holding or selling behavior
10	Three-way	Overconfidence × Anchoring × Herd Behaviour	Investor confidence, shared narratives, and collective enthusiasm reinforce each other	Speculative bubble; overvaluation
11	Four-way	Loss Aversion × Overconfidence × Anchoring × Herd Behaviour	Full behavioral feedback system: confidence, reference points, social imitation, and fear reinforce one another	Panic selling, bubbles, delayed recovery, excess volatility

Source: Developed by the Author

Discussion

Analysis of Two-Way Behavioral Interactions

Loss Aversion × Overconfidence

An additional psychological bias that influences the decision-making of investors that stems from the union of overconfidence

and loss aversion is a particularity that affects overconfident investors. Their overestimation regarding the skills they possess to interpret information from the market, estimate the price of an asset in the future and value their capacity to choose investments that are profitable in general is carried at the time of investing [7, 25]. As a result, they take more

risks than average; they concentrate their assets in few of their preferences and operate more than average. In a growing market, any of the behaviors of the companies where they invested favors the overconfidence, making them value that the results they are obtaining are due to their talent and ability and not to the favorable evolution of the market. The distortion of the reality leads them to underestimate the risk that the market decreases and to have a higher level of speculation.

The next bias, loss aversion, is particularly dangerous during the bear market. It prevents the investor from taking losses or admitting mistakes for his investments. An investor tends to hold fast to depreciating assets even when value-informing news is presented to him with false hopes of “recovering” the losses. It creates a behavioral trap because they become overconfident in their decisions and are making wrong investment choices and loss aversion prevents them from taking any action. As a result, they become victims of portfolio inertia and keep the failing investment. Instead of selling off unprofitable shares and admitting someone that the market is doing poorly, both Wolves are bearers of two biases. The two described biases promote the disposition effect and provide a perfect opportunity to understand how cognitive and emotional biases contribute to the ration withdrawal from one’s investment during the bear market.

Loss Aversion × Anchoring

Loss aversion and anchoring vindicates the idea of emotion and cognition being mutually supportive and powerful in terms of investment behaviour. Anchoring is wherein market participants give disproportionate weight to reference points (3). These reference points may be the price of the asset, past highs in indices or particular stocks, or current or past value of a portfolio, and so on, with these reference points factoring in assessment of

future pathway. Reference point here takes a psychological, as opposed to economic, valuation, with regards to absolute and relative gain and loss. The market events are gauged with respect to these anchors even if these had no further economic value.

Two other theories, which are closely related to the loss aversion theory, in a way strengthen the anchor effect, and are associated with emotional capital with the difference between the current state and the benchmark [4]. So, if the market price of the asset is falling compared to the purchase price, or lower than the previous maximum, then the investor feels a sense of loss. From an emotional point of view, our country feels that it has lost the market value of the asset in the range from the current state to expectations and previous dynamics on the market. Loss aversion theory states that we perceive loss as such, and re-evaluation of the asset - intrinsic and actual value vs. market price - becomes psychologically unpleasant to deal with. Therefore, we consider the loss of the asset to be profitable, with the hope that over time the market will return to anchor and compensate for the loss of value. The anchor effect strengthens the propensity to distance itself from the sale of the asset, even if the asset does not show positive dynamics. Loss aversion reduces market dynamics and the inertia of re-evaluation. In case of cravings phenomenon, the combination of loss aversion and the anchoring effect increases recovery periods. Investors refuse to change the perception of the market, the value of the asset from the old one to the new one [22, 23].

Loss Aversion × Herd Behavior

Similar economic forces responsible for herding behavior can also be explained through loss aversion as it deals with emotion-based human tendencies. Loss aversion had the investor experience to demonstrate the sensitivity to financial losses and uncertainty in even more another market asset drops than

market asset rises [4]. The most common emotion affecting investor behavior in a distressed market is fear so the investors are more likely to implicitly conform to the behavior of their peers to a much more less degree openly [6]. This does not prevent them from making independent decisions, but a lack of uncertainty makes them more vulnerable to a herd.

Herding behaviour [5] is another behaviour that is linked with the fear inducing shocks in the financial market. Long-term selling by investors results into panic selling and when panic is incorporate among other investors this seeing other side as the owners of the 'information' also and immediately following-down. Panic behaviour across the investors affects herd behaviour as in certain situations people are 'forced' to sell down off their holdings out of panic. It is the panic behaviour in shocks especially during major shocks impacting herding whereby there is the feeling the 'outbreak' of shock events are seen as triggers for panic buying and selling where panic is fly around. Herding shows evidence of behaviours that led to the buying conducted during the panic behaviour events and how the herding presented itself and influence this situations to debauch the accurate market behaviours to be the case as were the starting influences during the Global Financial Crisis and the COVID-Indicate behaviour collapse which lead were financial contagion runaway behaviour . It is this behaviour seen that necessitated the severe socio aspect of market executions have also been explained by the emotional elements that impaction herd during market breaking caused by the economic crisis [20-25].

Overconfidence × Anchoring

The overconfidence bias and anchoring bias are two misperception related cognitive biases that can induce a wrong perception of the data by the investor. The overconfidence bias makes the investor excessively confident in his

judgment and predictions. The anchoring bias makes the investor "anchored" to the first guesses of the price and other anchors [3, 7]. These cognitive biases may create a belief-based thinking - where the investor believes in any guess related to the increase or rise of the asset value, market perspective and general economic situation.

For the investors who are affected by both these biases, the process of information adaptation incorporates loss of anchors as well forecasting problems. Therefore, they tend to defer information adaptation. When the market is deteriorating, they prefer to cling to an overstated forecast despite worsened conditions in a decaying market. The combination of the two biases defers information trading, mispricing and overstatement. In a bullish market, overconfidence and anchoring biases strengthen each other, leading to the violation of a falsification mechanism, with investors treating positives as confirming and negatives as disconfirmatory evidence [22, 23]. The above cognitive rigidity increases the risks of damaging and stressful financial losses and price corrections.

Overconfidence × Herd Behavior

Another effect that overconfidence has impacting herd behavior is seemingly-habitually which contradicts the definition of herd behavior as an obvious consequence of confidence is the lack of independent thinking from the confident investor. Herd behavior stems from social validation of overconfidence by inflated self-perception of one's skills and talents in the financial markets, this causes the confident investor to believe that their ability to decide what is best for the market is better than anyone else but despite this superiority the other-honest, overconfident investor reinforces their decisions based off of the social-factor [7]. Being influenced by social validation, the investor believes they have discovered the most profitable opportunities

from the market which reinforces the now-confident decision from the investor. Overall, herd behavior and confidence creates a synergistic effect rather than adverse effects from the finance market.

Additionally, this phenomenon is accentuated in speculative periods in which the rise in prices and collective participation can lead to an illusion of consensus among participants. In such situations, it functions as a source of 'confirmation' of existing 'beliefs' for investors by observing the behavior of other participants and further reinforcing their conviction and encouraging participation. This generates a feedback mechanism that stimulates excessive optimism, speculation, and bubbles [20-24]. The current example of such effects are hype cycles with currencies like crypto currency, the rise in memes shares, and tech adventure bubbles, where collective enthusiasm strengthens investors' confidence in risky decisions. In this regard, the interaction demonstrates that social influence can amplify cognitive biases that destabilize the market.

Anchoring × Herd Behavior

The group behavior accounts for the non-empirical considering of the expectations set of the agent as groupings change only resulting state in the market. The anchoring bias signals how the validators center on the references points that are constant for all the units that are used by the traders on the floor previously to the communicate on the market [3, 5]. The grouping behavior bias arranging pulses the traders on the marketing company floor in their pegging reference point. All media units of communication, agencies, platforms and other mediators enters in the parties on the market and floor and in the insure unit are signals for anticipated company cost or promising market signal.

Finally, the functioning of herding allows to maintain the collective anchors, when they have been created, by reproducing the

tendency to conform and absence of desire to analyze the situation independently. The actors of the market are afraid to break with standard usually accepted because it brings them cognitive dissonance and social pressure. This is why the investors based on misleading or irrelevant but nevertheless preserved reference points through transformations of financial or non-financial context. The interaction between the functioning of collective anchors and herding practices makes it possible to maintain overprizing, postponement of adjustment and refusal of innovators to accept new evidence [22, 23]. Based on these findings, the author concluded that inefficiency of markets is not relevant to cognitive error of private investors but on social interaction of collective errors of cognition.

Analysis of Three-Way Behavioral Interactions

Loss

Aversion × Overconfidence × Anchoring

The second factor that is driving confidence bias is anchoring in uncertainty conditions. In most situations, overconfident market players are highly certain in their future expectations of the market general tendency and the value of their securities [7, 25]. These expectations are usually anchored on a reference point that may be initial price, expected profitability, or historical maximum market value [3]. If the market is showing price movement consistent with the investor's beliefs, the positive return in this case is perceived as a signal confirming the investor's ability to successfully predict the market, which reinforces his confidence in tendency and expectations.

All the behavioral influences of the loss aversion during a bearish market merely amplify the importance of deviations from these anchors, while investors are blind to their losses and to the opportunity to revise expectations [4]. Rather than keeping an adaptive portfolio that would communicate the information to the investor, the denial options

available from their primary reference points prevail, and they wait for prices to revert to their anchors. Consequently, a holding bias for their losing assets emerges, portfolio rebalancing is postponed and the continuation of malfunctioning investments is encouraged. The compound effect of emotional idleness, cognitive lock-in and over-optimism fully justifies the existence of the disposition effect and illustrates the mechanisms through which various biases conspired to undermine rationality during the downswings in the stock market.

Loss Aversion × Overconfidence × Herd Behavior

The phenomenon of speculative market cycles can be explained by loss aversion, overconfidence, and herd behavior. Overconfidence plays an important role in the rising phases of the business cycle since naturally people underestimate risk and overestimate expected returns [7]. Herd behavior contributes to the optimistic expectation at the market level, which gives additional social validation for participants to take further risks and invest [5]. Finally, the growing market participation reinforces the confidence of market participants, exciting new entrants to invest contributing raise in assets prices.

Sometimes it becomes a herd panic while memory behavior states, that when it turns to bear mode, the emotion of bearish sentiment is fear, which makes the loss to be aversive [4]. What a bubble investor thinks of, one who was overconfident with his investments. The only thing that will be in his mind is how to stop his funded capital from losing more. According to loss aversion nature, this makes the fear spread to his herd. The sentiment goes from "I am losing" to "we are losing", and the boom degenerates into a bust, the market goes from overconfidence to over worry in no time. This drives the volatility in the financial market, and at the end, it drives the financial system

into instability. From this perspective, we can see the connectivity between emotion theories, which led to cognitive theory, which led to social theory, all deepening at the same time their penetration in the financial market.

Loss Aversion × Anchoring × Herd Behavior

Notably, the stock market volatility associated with disasters can also be explained through loss aversion alongside herding and anchoring [3]. Loss aversion affected the financial market, forcing investors to stick to their target values set before the disaster and 'herd' along the entire irrational market, influenced by herding behavior. Therefore, anchoring made them hold their expectations and prices, and the market could not find the weakness behind the stable status quo. It could be too obvious for everyone to realize that the underlying is not as expected, but the market lacks the will to move either away from its expectations or toward accepting losses.

During this process, herding behavior takes the tasks away - an agreement is struck as to what the expectations of the starting point should be [5]. An investor who sees that other investors are not leaving the position takes their actions as a sign that it is best not to leave the position and continue with their forecast and also remains in the position longer than he or she otherwise would. This also applies to entire classes of investors who remain longer than they would have left at the wrong price. This in turn amplifies the effects of a drawn-out recovery, inefficient pricing and inertia in adjusting to the new economic realities after the shock. Overall, the research shows that the recovery process is in many cases driven by emotional attachment, cognitive inertia and herding more than by the economic reality.

Overconfidence × Anchoring × Herd Behavior

Overconfidence, anchoring and herding are arguably the most significant driver in the

formation of speculative bubbles. The signal overconfidence is the investor believes that their intuition of the market opportunities could surpass other participants'; anchoring is based on a specific expectation, valuation, or narrative [3, 7]. With positive market performance, the investor becomes increasingly confident that this would persist, augmenting their sense of optimism and risk-taking behavior.

Then, bubbles in prices could be amplified through collective mechanisms. There are collective steps by numerous participants which herd the same expectations across the markets [5]. Validations are done through collective action and this reinforces cognitive confidence and anchors. There are constructive expectation-holding mechanisms with positive expectations, leading more investors to the values and changes that diverge from fundamental readings. A few examples of the evidences are the Dot-Com Bubble, housing bubble that generated the Global Financial Crises and the bursting of various crypto currency bubbles. Cognitive confidence, anchors, and herd validation allow the markets to develop a positive bias initially towards the speculation and mispricing and then the corrections.

Four-way Interaction and Behavioral Systems Theory

The contribution of this study is that it established that the four-way interaction of the loss aversion, overconfidence, anchoring and related herd behavior had effect on investor behavior. These effects as explained previously interact on decision-making process of retail investors on two-way and three-way depictions. Nevertheless, the

complex systems model has effect on four-way and higher-order interaction since it is an integrated effect of emotional, cognitive and social. In this model, the investors value overconfidence (herd behavior), faith in the course of the market path (overconfidence), stable expectations (anchoring) and the positive influence of social interactions on flocking animals on the increase of over-confidence and expectations [3, 5, 7]. This model operates under positive feedback and away from the fundamental value of price because of the position of flocks in the market.

Unrealized losses associated to loss adventures and bad news on one or more of the co-movements investments markets [4]. The former bias is the one used to trigger evidence that the investment market is bad after previous assessments and the overall news idea from other markets that the investor refuses to accept. Pain of loss increases versus sums, social consensus and cognitive anchors help to guide making decisions regarding realizing a loss. The herd effect that brought the optimism consensus during previous euphoric stages gives rode to disbelief and negative effects that make radiate and enhance the new losses. Co-moving variables have play in the same exercise a recurrent feedback dynamic such that the confidence, expectations, social behavior and emotional response reinforce each other in each round of the cyclical process. The emerging conclusion from their arguments is that the underlying and explanatory variable of these phenomena is not the individual investor irrationality but systemic one, based on common effects. Figure 2 illustrates the full Behavioral Systems Theory Model.

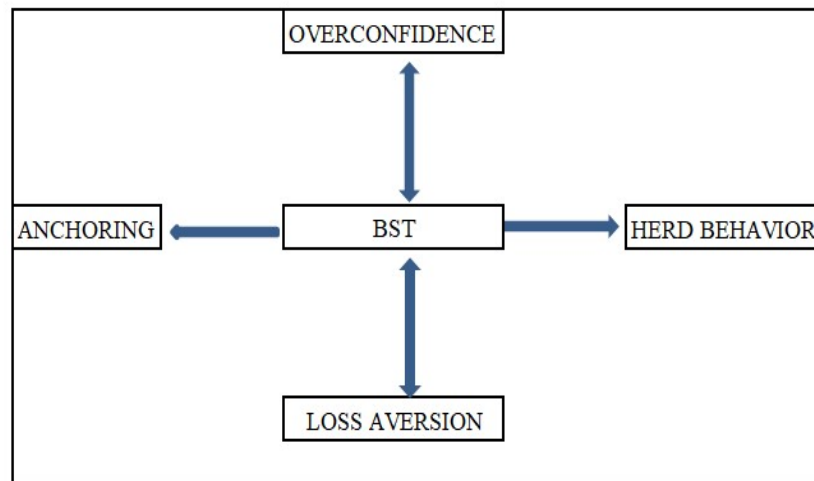


Figure 2. Full Behavioral Systems Theory Model

Source: Developed by the Author

Within this four-way relationship, Behavioral Systems Theory (BST) portrays itself as a novel and unified behavioral framework wherein the investors' behavior in condition of uncertainties and crises bears the implication of BST. The general premise of the theory assumes that financial decision-making is shaped by three key dimensions which correspond to on-field financial psychology, that is 1) emotional dimension based on the loss aversion at the core of the fear and greed systems, 2) cognitive dimension linked to overconfidence and anchoring biases, and 3) social dimension associated with herd behavior. Instead of being treated as individual components, each of these dimensions interacts with one another via feedback loops that allow the emergence of undesired behavioral outcomes. Therefore, speculative bubbles, panic selling, time in the black, excessive volatility and financial contagion along with many other phenomena might be the outcome of a behavioral system at play.

Theoretical contribution of the model - BST contributes as a theoretical framework by positioning itself in contrast to common behavioral finance models. It is acknowledged that previous research has demonstrated the impact on financial decisions due to specific behavioral biases. However, no systematic investigation exists that focused on it in detail.

Understanding that a financial crisis usually does not occur due to only one behavioral bias but because several biases interact among themselves and with other ones. BST architecture in behavioral finance offers a multidimensional explanation for market failure since it understands investor behavior occurs due to influencing dynamic interactions between emotional factor, cognitive factor, and social factor. It rises to an increased understanding of mechanisms and their synergetic implications in the financial market in the light of behavioral finance within a systems approach.

Contributions

This study contributes to behavioral finance literature in several important ways.

1. It develops a Behavioral Systems Theory integrating cognitive, emotional, and social biases.
2. It extends behavioral finance beyond isolated-bias analysis.
3. It applies combination theory to multidimensional behavioral interactions.
4. It integrates narrative finance and complexity theory into behavioral finance research.

Practical Implications

The findings provide practical implications for investors, regulators, financial institutions, and policymakers.

Investors should recognize that irrational decision-making often emerges from interacting biases rather than isolated psychological distortions. Financial institutions may incorporate behavioral risk monitoring into portfolio management systems. Regulators may use behavioral systems analysis to anticipate speculative bubbles, panic selling, and crisis contagion.

The study also suggests that digital investment platforms should consider implementing behavioral safeguards capable of reducing emotional contagion and speculative amplification.

Conclusions and Recommendations

The analysis done in this article showcases how irrational behaviour of investors during the crisis timeline can be best holistically explained by the multidimensional behavioural model which is interconnected through the feedback system of loss aversion, overconfidence, anchoring and herd effect. None of the behavioural bias works in isolation rather they all interconnect and interplay with each other through the emotional, cognitive and social feedback systems.

It justifies as well that modern-day digitalized finance has made collective behavior from traders' activities in online-social media, hype-communities, and algorithm-driven information systems and has caused the collective behavior whereby fluctuations in the market and emotions circulate among the financial system.

The study recommends that future research:

1. Empirically test the Behavioral Systems Theory using SEM and longitudinal data.

2. Examine cross-country variations in multidimensional behavioral interactions.
3. Develop behavioral intervention mechanisms capable of reducing crisis-driven irrationality.
4. Expand behavioral systems analysis to institutional and corporate investment behavior.

Data Availability

No new datasets were generated or analyzed during this study. The research is based entirely on qualitative narrative synthesis of publicly available secondary sources, including peer-reviewed journal articles, scholarly books, institutional reports, and documented historical accounts of major financial crises such as the Dot-Com Bubble, the Global Financial Crisis (2008), the COVID-19 market crash, and post-pandemic market developments. All sources used in the preparation of this manuscript are cited in the reference list.

Funding

This research received no external funding. The authors received no financial support from any public, commercial, or not-for-profit funding agency for the research, authorship, or publication of this article.

Ethical Approval

The study relies exclusively on secondary literature and publicly available crisis narratives. Ethical approval was therefore not required.

Acknowledgements

The author wishes to acknowledge Dr. Olusola Omisakin for his invaluable academic guidance and mentorship throughout the development of this research.

Conflict of Interest

The author declares no conflict of interest.

References

- [1]. Fama EF. Efficient capital markets: A review of theory and empirical work. *J Finance*. 1970; 25(2):383–417.<https://doi.org/10.2307/2325486>
- [2]. Markowitz H. Portfolio selection. *J Finance*. 1952; 7(1):77–91.<https://doi.org/10.2307/2975974>
- [3]. Tversky A, Kahneman D. Judgment under uncertainty: Heuristics and biases. *Science*. 1974; 185(4157):1124–31.
<https://doi.org/10.1126/science.185.4157.1124>
- [4]. Kahneman D, Tversky A. Prospect theory: An analysis of decision under risk. *Econometrica*. 1979; 47(2):263–91.
<https://doi.org/10.2307/1914185>
- [5]. Bikhchandani S, Hirshleifer D, Welch I. A theory of fads, fashion, custom, and cultural change as informational cascades. *J Polit Econ*. 1992; 100(5):992–1026.<https://doi.org/10.1086/261849>
- [6]. Arthur WB. Complexity and the economy. *Science*. 1999; 284(5411):107–9.
<https://doi.org/10.1126/science.284.5411.107>
- [7]. Barber BM, Odean T. Trading is hazardous to your wealth. *J Finance*. 2000; 55(2):773–806.
<https://doi.org/10.1111/0022-1082.00226>
- [8]. Thaler RH. Mental accounting matters. *J Behav Decis Making*. 1999; 12(3):183–206.[https://onlinelibrary.wiley.com/doi/10.1002/\(SICI\)1099-0771\(199909\)12:3%3C183::AID-BDM318%3E3.0.CO;2-F](https://onlinelibrary.wiley.com/doi/10.1002/(SICI)1099-0771(199909)12:3%3C183::AID-BDM318%3E3.0.CO;2-F)
- [9]. Hirshleifer D. Behavioral finance. *Annu Rev Financ Econ*. 2015; 7:133–59.
<https://doi.org/10.1146/annurev-financial-092214-043752>
- [10]. Polkinghorne DE. Narrative knowing and the human sciences. Albany: SUNY Press; 1988.
- [11]. Bruner J. The narrative construction of reality. *Crit Inquiry*. 1991; 18(1):1–21.
<https://doi.org/10.1086/448619>
- [12]. Clandinin DJ, Connelly FM. Narrative inquiry: Experience and story in qualitative research. San Francisco: Jossey-Bass; 2000.
- [13]. Riessman CK. Narrative methods for the human sciences. Thousand Oaks: Sage; 2008.
- [14]. Akerlof GA, Shiller RJ. Animal spirits. Princeton: Princeton University Press; 2009.
- [15]. Kahneman D. Thinking, Fast and Slow. New York: Farrar, Straus and Giroux; 2011.
- [16]. Thaler RH. Misbehaving: The making of behavioral economics. New York: W.W. Norton; 2015.
- [17]. Shiller RJ. Narrative economics. *Am Econ Rev*. 2017; 107(4):967–1004.
<https://doi.org/10.1257/aer.107.4.967>
- [18]. Shiller RJ. Narrative economics: How stories go viral and drive major economic events. Princeton: Princeton University Press; 2019.
- [19]. Gabaix X, Koijen RSJ. In search of the origins of financial fluctuations: The inelastic markets hypothesis. *Annu Rev Financ Econ*. 2021; 13:149–74.
<https://doi.org/10.1146/annurev-financial-101420-015100>
- [20]. Kengatharan L. Cognitive, emotional and behavioral biases in financial decision making: A review. *Int J Econ Bus Adm*. 2023; 11(1):1–20.
<https://doi.org/10.35808/ijeba/834>
- [21]. Baker HK, Filbeck G, Ricciardi V. Financial behavior and crisis decision-making. *Res Int Bus Finance*. 2021.
- [22]. Barberis N. Psychology-based models of asset prices and trading volume. In: *Handbook of Behavioral Economics*. 2018.
<https://doi.org/10.1016/bs.hesbe.2018.07.002>
- [23]. Gigerenzer G, Gaissmaier W. Heuristic decision making. *Annu Rev Psychol*. 2011; 62:451–82.
<https://doi.org/10.1146/annurev-psych-120709-145346>
- [24]. Baker HK, Kumar S, Singh H. Behavioural biases among investors: A systematic literature review. *Int J Emerg Mark*. 2021.
<https://doi.org/10.1108/IJOEM-07-2020-0749>
- [25]. Ben-David I, Graham JR, Harvey CR. Managerial miscalibration. *Q J Econ*. 2013; 128(4):1547–84.
<https://doi.org/10.1093/qje/qjt023>