Cognitive and Emotional Dynamics in Investment: A Review of Behavioral Finance Theories and Modern Applications

Qi Wu*

New York University, 50 West 4th Street, New York, NY 10012, USA

*qw2282@nyu.edu

Abstract. This paper provides a comprehensive literature review of behavioral finance, a field that challenges the traditional assumptions of investor rationality by incorporating insights from psychology, neuroscience, and behavioral economics. Drawing on foundational theories such as Prospect Theory, Mental Accounting, and the Representativeness Heuristic, the paper outlines how investors systematically deviate from rational expectations through biases like herding, overconfidence, and loss aversion. It further explores recent advancements including the Adaptive Market Hypothesis, emotional influences on decision-making, neurofinance, and behavioral responses during financial crises and in emerging asset classes like cryptocurrency. Through qualitative content analysis of high-impact academic studies, this research synthesizes empirical evidence that demonstrates the pervasive role of cognitive and emotional biases in shaping investment behavior, portfolio allocation, and market anomalies. The findings highlight the limitations of classical financial models in real-world contexts and emphasize the importance of incorporating behavioral insights into financial education, regulatory frameworks, and algorithmic trading systems. Ultimately, the paper advocates for more adaptive and psychologically informed approaches to better understand and predict market behavior in dynamic and complex evolving financial environments.

Keywords: Behavioral Finance, Modern Portfolio Theory, Adaptive Market Hypothesis, Emotional Decision Making

1 Introduction

Modern Portfolio Theory (MPT), introduced by Harry Markowitz in 1952, established a formalized framework for constructing optimal investment portfolios by balancing risk and return [1]. It assumes that investors are rational and risk-averse, seeking to maximize their expected utility by diversifying their portfolios to achieve the most efficient risk-return tradeoff. Building upon this, Eugene Fama proposed the Efficient Market Hypothesis (EMH), which asserts that financial markets are "informationally efficient," meaning that asset prices always reflect all available information [2]. Consequently, no investor can consistently achieve above-average returns through stock

© The Author(s) 2025

B. Siuta-Tokarska et al. (eds.), *Proceedings of the 2025 3rd International Academic Conference on Management Innovation and Economic Development (MIED 2025)*, Advances in Economics, Business and Management Research 348,
https://doi.org/10.2991/978-94-6463-835-6_29

selection or market timing under EMH, as all known information is already embedded in prices.

Underlying MPT and EMH is the rational expectations hypothesis — the belief that investors act rationally, processing information logically and consistently to make decisions that maximize their welfare. However, this paradigm has been increasingly criticized for its unrealistic portrayal of human behavior in financial contexts. In reality, investors often display biases, follow heuristics, and react emotionally to market events, deviating from the rational-agent model. Real-world crises like the dot-com bubble or the 2008 financial collapse reveal the shortcomings of assuming universally rational actors in financial markets [3].

A pivotal shift occurred with the work of Daniel Kahneman and Amos Tversky, whose Prospect Theory challenged the traditional utility model by demonstrating that individuals value gains and losses asymmetrically, often making inconsistent or irrational choices under risk [4]. Their research opened the door to Behavioral Finance: a discipline that combines psychology and economics to explain anomalies in financial decision-making that classical theories cannot account for.

Behavioral Finance recognizes that cognitive biases, social influences, and emotional reactions significantly affect investment choices. It addresses why markets can deviate from fundamental values and why investors may overreact or underreact to information. Such insights are crucial in understanding phenomena like herding behavior, overconfidence, and loss aversion, which EMH does not adequately explain. By studying investor behavior in depth, we can improve forecasting models, design better financial products, and formulate policies that promote market stability.

This research is a literature review paper that synthesizes key findings in behavioral finance from academic journal articles, books, and empirical studies. The methodology involves qualitative content analysis of primary economics, psychology, and finance literature. Sources were selected based on relevance, academic impact, and contribution to understanding investor behavior.

The structure of this paper is organized to provide a comprehensive review of behavioral finance across both foundational and emerging areas. Section 2 focuses on Classical Behavioral Theories in Decision-Making, examining core concepts such as Prospect Theory, Mental Accounting, and the use of heuristics that challenge the assumptions of rational investor behavior. Section 3 delves into Recent Advances in Behavioral Finance, highlighting developments in Neuro-finance, the application of Emotional AI, and the increasing role of Big Data in modeling investor psychology. Finally, Section 4 presents the conclusion, summarizing key insights, addressing limitations within the existing literature, and proposing future directions for research, particularly in the context of applying behavioral insights to areas such as financial regulation, trading strategies, and asset management.

2 Classical Behavioral Theories in Decision-Making

Traditional financial theories assume investors are fully rational and make decisions to maximize utility. In contrast, behavioral finance recognizes that real-world investors

are influenced by limited cognitive ability, emotions, and social pressures—a concept known as bounded rationality [3]. As a result, people often make systematic errors in judgment.

A key framework in this field is Prospect Theory, which shows that individuals assess outcomes relative to a reference point and exhibit greater sensitivity to losses than gains [4]. These insights challenge the idea of consistently rational behavior in markets. This section explores six classic behavioral concepts—herding, overconfidence, loss aversion, anchoring, mental accounting, and the representativeness heuristic—that explain how such biases shape investor decision-making.

2.1 Herding Effect

The herding effect occurs when investors mimic the actions of others rather than relying on their independent analysis. This behavior often arises from uncertainty and the belief that others may possess superior information. Herding is prominently visible in speculative bubbles and market crashes, where the collective behavior of market participants drives prices away from intrinsic values.

Banerjee formalized a model of herd behavior, showing how individuals, even when acting sequentially and rationally, may ignore their private signals to follow the crowd [5]. Similarly, Bikhchandani, Hirshleifer, and Welch introduced the concept of information cascades, where early movers' actions heavily influence later decisions, leading to convergence on a potentially erroneous consensus [6]. Shiller further emphasized the role of herd behavior in inflating asset prices during speculative bubbles, pointing to behavioral contagion as a key factor in market volatility [7].

Herding undermines market efficiency by amplifying trends regardless of fundamentals, resulting in price overreactions, asset bubbles, and subsequent crashes when investor sentiment shifts.

2.2 Overconfidence Bias

Overconfidence bias captures investors' tendency to overrate their knowledge, predictive accuracy, and level of control over financial outcomes. It leads to inflated self-assessments, excessive trading, and underestimation of risks.

Barber and Odean provided empirical evidence that overconfident investors tend to trade more frequently than their less confident peers, ultimately diminishing their net returns as a result of higher transaction costs [8]. In a corporate finance context, Malmendier and Tate showed that overconfident CEOs are more inclined to undertake value-destroying mergers, as they overrate their ability to generate synergies [9].

The consequences of overconfidence include suboptimal asset allocation, higher turnover, increased volatility, and susceptibility to speculative losses—all of which deviate from rational investment behavior.

2.3 Loss Aversion

Loss aversion describes the phenomenon where individuals perceive losses as significantly more impactful than gains of the same magnitude, leading to a stronger emotional response to losing than to winning. This asymmetry, central to Prospect Theory [4], results in behaviors such as the disposition effect—where investors are inclined to sell winning investments too early to "lock in gains" and hold onto losing investments too long in the hope of recovery.

Odean provided strong evidence of the disposition effect in retail investors, showing that losing stocks are held longer while winning stocks are prematurely sold [10]. This behavior contradicts the rational decision-making model and leads to missed opportunities for portfolio optimization.

Loss aversion distorts risk preferences and leads to inefficiencies in portfolio management, especially during periods of high market uncertainty.

2.4 Anchoring Bias

Anchoring is a cognitive bias in which individuals place disproportionate weight on an initial piece of information—the "anchor"—when making decisions. In financial contexts, this often appears as price anchoring, where investors cling to a previous stock price or an analyst's forecast, despite the availability of new information that calls for a revised evaluation.

Tversky and Kahneman demonstrated anchoring through a series of experiments showing that arbitrary numerical values can disproportionately influence judgment [11]. George and Hwang extended this idea to financial markets, providing evidence that stock prices exhibit inertia due to anchoring on past reference points, thereby delaying the full incorporation of new information into prices [12].

Anchoring can lead to market mispricing, underreaction to news, and delayed corrections, all of which challenge the assumptions of the Efficient Market Hypothesis.

2.5 Mental Accounting

Mental accounting, a concept introduced by Thaler, describes how individuals mentally compartmentalize money based on its source or intended purpose [13]. For instance, investors might treat dividends differently from capital gains or speculate more with "house money" (profits) than with principal capital.

Shefrin and Statman extended this concept in their behavioral portfolio theory, arguing that investors build portfolios not as a single utility-maximizing entity but as layers of mental accounts, each serving different purposes (e.g., safety vs. aspiration) [14].

This mental compartmentalization leads to inefficiencies in portfolio construction and risk management, as investors may ignore correlations across mental accounts or fail to apply consistent risk assessments across assets.

2.6 Representativeness Heuristic

The representativeness heuristic occurs when individuals judge probabilities based on how closely an event or outcome matches a stereotype, often ignoring statistical realities such as base rates or sample size. In financial contexts, this can lead to excessive optimism about recent winners or pessimism about recent losers.

Kahneman and Tversky found that people often misjudge randomness and overattribute patterns to statistically independent events [15]. De Bondt and Thaler applied this to financial markets, documenting that investors tend to overreact to recent news and extrapolate past performance into the future, leading to price reversals as expectations are eventually corrected [16].

This heuristic contributes to momentum investing and bubbles, followed by crashes when corrections occur, further highlighting the limits of rational expectations.

3 Recent Advances in Behavioral Finance

While classical behavioral theories laid the groundwork for understanding irrational investor behavior, recent advances delve deeper into dynamic market environments, emotional and neural influences, and how cognitive biases interact with real-world variables such as market crises and information asymmetry. These developments provide a more nuanced understanding of how behavior shapes financial decisions in rapidly evolving markets, including emerging sectors like cryptocurrencies and during extreme volatility events such as the COVID-19 pandemic.

3.1 Adaptive Market Hypothesis

Andrew Lo's Adaptive Market Hypothesis (AMH) bridges the gap between traditional finance and behavioral insights by suggesting that markets evolve and adapt over time in response to environmental changes, investor learning, and competition [17]. Unlike the Efficient Market Hypothesis, AMH allows for periods of both efficiency and inefficiency, depending on context and investor adaptation.

Khuntia and Pattanayak found that Bitcoin's return predictability varied across time, supporting the AMH framework [17]. Shahid demonstrated how commodity markets adapted dynamically during the COVID-19 pandemic, reflecting evolving efficiency under crisis conditions [18]. Barberis further suggested that AMH offers a realistic lens for reconciling behavioral anomalies with overall market functioning [19].

3.2 Emotional Influence on Investment Decisions

Emotions such as fear, regret, or excitement can override rational decision-making, particularly in volatile markets. Cantarella, Hillenbrand, and Brooks found that incidental emotions and framing jointly affect investment risk-taking [20]. Brooks et al. observed that positive emotional states increased risk tolerance, particularly under optimistic framing [21].

Padmavathy identified how emotions like greed and fear can amplify market bubbles or crashes [22]. Giglio, Stroebel, and Wurgler also demonstrated that COVID-19-related beliefs shaped perceived risk and directly influenced market behaviour [23]. Baker et al. linked investor sentiment and emotional contagion to market anomalies, especially during periods of uncertainty [24].

As emotional biases can lead to systemic distortions, investor education and emotion-aware advisory tools are increasingly advocated.

3.3 Neurofinance: The Brain Behind Financial Choices

Neurofinance investigates the biological and neural processes underlying financial decision-making, offering insights into how the brain reacts to risk, reward, and uncertainty. This interdisciplinary field combines neuroscience, psychology, and economics to decode the mental architecture of investor behavior.

A notable recent contribution by Liu et al. involved modeling sub-rational investor behavior using reinforcement learning [25]. The study showed that decision-making pathways in the brain are not purely utility-maximizing but are influenced by emotional feedback and learning mechanisms over time. Neurofinance also reveals that brain regions like the amygdala and prefrontal cortex are critical in processing fear and cognitive control, which directly impacts trading behavior and risk preferences.

These findings have practical implications: financial advisors and policymakers can develop tools to help mitigate biases by aligning strategies with cognitive limitations and promoting better decision architectures.

3.4 Behavioral Biases During Crises

Investor behavior during financial crises tends to become more biased and emotionally driven. Stress, fear of loss, and social influence intensify, leading to panic selling, irrational flight to safety, and increased herd behavior.

Haran Rosen and Sade examined how behavioral "nudges" during crises had disparate effects across different demographic groups, with some investors becoming more responsive to emotional cues than others [26]. Similarly, Hurwitz, Mitchell, and Sade demonstrated that interventions designed to improve financial planning (like enhancing longevity awareness) can counteract crisis-induced myopia [27].

Padmavathy also noted that behavioral anomalies such as the disposition effect and anchoring bias become more pronounced during turbulent periods. Recognizing and mitigating such behaviors—through education or digital behavioral prompts—can help reduce the systemic risk associated with mass irrational reactions [22].

3.5 Behavioral Finance in Emerging Asset Classes: Evidence from Cryptocurrency Markets

A growing body of research explores how behavioral finance applies to cryptocurrencies—markets characterized by high volatility, lack of regulation, and extreme information asymmetry. Abdeldayem and Aldulaimi investigated investor behavior in the

GCC cryptocurrency market, revealing that herding behavior, heuristics, and prospect theory significantly influenced decision-making, accounting for 16.5% of the variance in investment choices [28].

Their findings emphasize that investors tend to rely on peer decisions (herding), past reference points (anchoring), and emotional judgments like fear of missing out or loss aversion during bull markets. These patterns align with earlier studies on behavioral finance in traditional equity markets but are amplified due to the speculative nature of cryptocurrencies.

3.6 Anchoring Bias and Its Cognitive Interplay

Anchoring bias arises when investors place excessive emphasis on initial information—such as past prices or analyst forecasts—when making decisions. This bias distorts perception and prevents proper adjustment when new data becomes available.

Pervez et al. explored anchoring bias among investors in the Pakistani stock exchange and revealed that it significantly influenced decision-making, particularly when shaped by risk perception and information asymmetry [29]. Their study introduced a comprehensive model indicating that risk perception acts as a mediating factor—investors with strong loss aversion and heightened perceived risk were more susceptible to anchoring. Additionally, information asymmetry served as a moderating factor, whereby the anchoring effect became stronger in environments with limited access to reliable information. These findings underscore the importance of transparent financial communication and enhanced investor education, particularly in emerging markets where information gaps are prevalent.

Recent empirical evidence further supports the cognitive and contextual complexity of anchoring in financial decision-making. Maheswaran and Shekhar conducted an experimental study using simulated trading environments and found that the anchoring effect persists even when participants are made aware of their biases, especially under conditions of time pressure and limited data transparency [30]. Their results reinforce the notion that anchoring is not only cognitively ingrained but also magnified by situational stressors—factors often present in emerging and volatile markets. These insights highlight the need for behavioral prompts and decision support systems that actively guide investors away from reliance on arbitrary reference points, especially in fast-moving or uncertain environments.

3.7 Cross-Market Comparisons and Experimental Evidence

Rosid et al. conducted experimental simulations in the Indonesian capital market to examine how behavioral biases such as overconfidence, herding, and loss aversion influence portfolio decisions [31]. Their findings revealed that overconfident investors tend to trade excessively, often underestimating the associated risks. This behavior leads to higher portfolio turnover and increased vulnerability to market volatility.

The study also highlighted the prevalence of herding behavior, which contributed to the formation of price bubbles during market upswings and sharp corrections during

downswings. Such collective momentum-driven trading distorts asset prices and amplifies market instability [32].

Additionally, loss-averse investors were found to hold onto losing stocks for too long while prematurely selling winning ones—a pattern that closely mirrors the disposition effect identified by Odean in traditional markets [8]. These experimental results validate core behavioral finance models in real-world scenarios and emphasize the need for investor education programs that include bias-mitigation training to promote more rational and informed decision-making.

4 Conclusion

This paper has explored the foundational and evolving theories within behavioral finance, emphasizing how psychological and emotional factors significantly impact investor decision-making. Classical biases such as herding, overconfidence, loss aversion, anchoring, mental accounting, and representativeness heuristics demonstrate that investors often deviate from rational, utility-maximizing behavior. These biases lead to common market phenomena including speculative bubbles, excessive trading, suboptimal asset allocation, and delayed reactions to new information. Numerous empirical studies show that these irrational behaviors are neither random nor isolated—they are systematic and predictable.

Recent advancements in behavioral finance further enrich our understanding by incorporating adaptive and interdisciplinary perspectives. The Adaptive Market Hypothesis introduces a dynamic view of market efficiency, acknowledging that investor behavior and market conditions evolve. Research in microfinance and emotional finance reveals how brain activity and emotional states influence financial decisions, particularly during periods of uncertainty and crisis. Additionally, models incorporating mediating and moderating variables—such as risk perception and information asymmetry—highlight the nuanced ways in which cognitive biases like anchoring manifest in different market environments.

Behavioral finance plays a critical role in enhancing traditional financial models. Incorporating human behavior into analytical frameworks provides a more realistic representation of financial markets and allows for better prediction of anomalies that classical models fail to explain. Integrating behavioral insights into financial practice can lead to more effective investor education, improved regulatory policies, and smarter asset management strategies. Tools such as behavioral nudges, emotional intelligence training, and real-time feedback mechanisms have practical applications in helping investors make more rational decisions.

Looking ahead, future research should continue to explore the integration of behavioral factors into algorithmic trading systems and AI-based investment platforms. As financial markets become more digitized and globalized, understanding cross-cultural variations in behavioral biases will also be increasingly important. Moreover, experimental and field studies can further investigate the interaction between digital financial technologies and investor psychology, especially in emerging markets where infor-

mation asymmetry remains a challenge. Finally, expanding behavioral finance into areas such as ESG investing, crypto-assets, and decentralized finance could provide valuable insights into how modern investors balance emotional, ethical, and financial considerations in an increasingly complex investment landscape.

Behavioral finance has reshaped how we interpret markets and offers a promising path toward creating more inclusive, adaptive, and psychologically informed financial systems.

References

1. Markowitz, H.: Portfolio selection. *J. Finance* 7(1), 77–91 (1952).
2. Fama, E.F.: Efficient capital markets: A review of theory and empirical work. *J. Finance* 25(2), 383–417 (1970).
3. Oprea, R.: Decisions under risk are decisions under complexity. *Am. Econ. Rev.* 114(12), 3789–3811 (2024).
4. Kahneman, D., Tversky, A.: Prospect theory: An analysis of decision under risk. *Econometrica* 47(2), 263–291 (1979).
5. Banerjee, A.V.: A simple model of herd behaviour. *Q. J. Econ.* 107(3), 797–817 (1992).
6. Bikhchandani, S., Hirshleifer, D., Welch, I.: A theory of fads, fashion, custom, and cultural change as informational cascades. *J. Polit. Econ.* 100(5), 992–1026 (1992).
7. Shiller, R.J.: *Animal Spirits: How Human Psychology Drives the Economy*. Princeton University Press, Princeton (2021).
8. Barber, B.M., Odean, T.: Boys will be boys: Gender, overconfidence, and common stock investment. *Q. J. Econ.* 116(1), 261–292 (2001).
9. Malmendier, U., Tate, G.: CEO overconfidence and corporate investment. *J. Finance* 60(6), 2661–2700 (2005).
10. Odean, T.: Are investors reluctant to realise their losses? *J. Finance* 53(5), 1775–1798 (1998).
11. Tversky, A., Kahneman, D.: Judgment under uncertainty: Heuristics and biases. *Science* 185(4157), 1124–1131 (1974).
12. George, T.J., Hwang, C.-Y.: The 52-week high and momentum investing. *J. Finance* 59(5), 2145–2176 (2004).
13. Thaler, R.H.: Mental accounting and consumer choice. *Mark. Sci.* 4(3), 199–214 (1985).
14. Shefrin, H., Statman, M.: Behavioural portfolio theory. *J. Financ. Quant. Anal.* 35(2), 127–151 (2000).
15. Kahneman, D., Tversky, A.: On the psychology of prediction. *Psychol. Rev.* 90(4), 293–315 (1983).
16. De Bondt, W.F.M., Thaler, R.H.: Does the stock market overreact? *J. Finance* 40(3), 793–805 (1985).
17. Khuntia, S., Pattanayak, J.K.: Adaptive market hypothesis and evolving predictability of Bitcoin. *Econ. Lett.* 167, 26–28 (2018).
18. Shahid, M.: COVID-19 and adaptive behavior of returns: Evidence from commodity markets. Working paper (2022).
19. Barberis, N.: Psychology-based models of asset prices and trading volume. In: Hens, T., Bachmann, K. (eds.) *Handbook of Behavioral Economics*, pp. 79–99. Elsevier, Amsterdam (2018).
20. Cantarella, I., Hillenbrand, C., Brooks, C.: Framing and incidental emotions in investment decisions. Manuscript submitted for publication (2023).

21. Brooks, C., Cantarella, I., Hillenbrand, C.: The importance of staying positive: The impact of emotions on attitude to risk. Manuscript submitted for publication (2023).
22. Padmavathy, M.: Behavioral finance and stock market anomalies. *Shanlax Int. J. Manag.* 11(S1), 191–197 (2024).
23. Giglio, S., Stroebel, J., Wurgler, J.: Financial market beliefs and risk perceptions during COVID-19. *Rev. Financ. Stud.* 34(9), 4046–4085 (2021).
24. Baker, M., Wurgler, J., Yuan, Y.: Behavioral finance: Emotion and market anomalies. *Annu. Rev. Financ. Econ.* 14, 415–439 (2022).
25. Liu, X., et al.: Modeling sub-rational human investors using reinforcement learning. Conference presentation or preprint (2022).
26. Haran Rosen, Y., Sade, O.: Disparate effect of nudges on minority groups during crises. Working paper (2022).
27. Hurwitz, J., Mitchell, O.S., Sade, O.: Testing methods to enhance longevity awareness during COVID-19. Working paper (2022).
28. Abdeldayem, M., Aldulaimi, S.: Investment decisions determinants in the GCC cryptocurrency market. *Int. J. Organ. Anal.* (2023).
29. Pervez, Z., Shah, T.A., Khattak, A.: The influence of anchoring bias in stock exchange investments. *J. Bus. Manag. Res.* 4(1), 476–486 (2025).
30. Maheswaran, D., Shekhar, S.: Anchoring under pressure: Evidence from experimental asset markets. *J. Behav. Exp. Finance* 40, 100793 (2023). https://doi.org/10.1016/j.jbef.2023.100793
31. Rosid, A., et al.: Behavioral finance in decision making: An experimental study. *Jurnal Ekonomi* 13(3), 579–589 (2024).
32. Khalingga, M.A., Galih, W., Risnanto, S., Abimanyu, K.: Behavioral finance: The impact of herding behavior on investment decisions—The case of companies listed in the LQ-45 Index in the Indonesian Stock Exchange (BEI) for the period 2018–2020. *Multifinance* 2(2), 19–30 (2024).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.