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A Comprehensive Review of Human Psychology's Role in Shaping Stock Market Investments: Behavioral Finance Insights

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Abstract

Most investors view the stock market as a place to trade shares where everything is well organized based on data and economic factors. Investors behave rationally after analyzing the market based on related data and news. However, behavioural finance shifts the traditional view, emphasising human emotions and cognitive bias. This review explores the intersection of how human psychology, such as cognitive bias, emotion, and cultural background, drives retail investment decisions across global stock markets in the past decades. Important psychological aspects of loss aversion, overconfidence, herding, and anchoring are examined to determine how they affect market efficiency and the pricing of assets.

In the review, we outline the evolution, strengths, and weaknesses of financial theory and models from classical paradigms like efficient markets hypothesis, CAPM, through behavioral finance to emerging neurofinance. In addition, we consider both qualitative and quantitative research concerning cognitive and emotional biases, such as overconfidence, herding, and loss aversion, which influence the decision-making processes of individual investors. By combining empirical data and theoretical models, this review offers a better view of the reasons behind unregulated markets and the role played by cognitive biases in destabilizing the market. The findings point to applying approaches in investment and financial literacy to help curb the detrimental effects of irrational thinking.

Keywords: Behavioral Finance, Cognitive Biases, Investor Psychology, Stock Market Investments, Market Volatility, Loss Aversion, Overconfidence, Herd Behavior, etc.

Introduction

Finance, to most people, is money, interest rates, savings, and taxes, whereas finance is a management stream that deals with money and its related topics, such as credit, banking, and investing. Conversely, investment is a surplus of asset strategies in equity, bond, and stock markets. In the stock market, you find savers with extra cash who want to invest it, earn a return by taking on risk and outpacing inflation, and spend their efforts buying or selling stocks. Many standard finance theories focus on the rational decision-making of investors for building wealth like **Capital Asset Pricing Model (CAPM)[1] and Efficient Market Hypothesis (EMH)** or ***Homo Economicus[2].*** However, the technological advancement of the late 1990s and early 2000s, the worldwide recession of 2008, and many other such incidents in history created a curiosity among investors and financial analysts that the explanations of the standard finance theories could not offset. Therefore, a new field, Behavioural Finance, emerged, which had explanations for the market anomalies. It could explain how factors such as emotional and psychological influences affect the behavior of investors while making investment decisions**[3].** This new field of finance was a combination of behavioral and cognitive psychological theories and standard finance, and it could explain why investors made irrational decisions while investing. Neurofinance strives to understand financial decision-making by combining psychology and neuroscience with traditional finance theory. Neurofinance partially incorporates behavioral finance, the biological mechanisms of financial market participants**[4].** Prospect Theory **(Kahneman & Tversky, 1979)** and early findings on heuristics and biases **(Tversky & Kahneman, 1981, 1992)** demonstrated that investors are loss-averse and susceptible to framing, predisposing them to systematic errors. Researchers like **Shefrin and Statman (1985)** documented the disposition effect, further undermining classical models. **Van Brussel et al. (2024)** showed a reward-related region when professional investors evaluate stocks is higher for stocks that later outperform. This suggests that beyond psychology, neural responses may carry information not captured by traditional metrics. **Hirshleifer (2015)** even argues that finance needs to move beyond individual biases to a broader social finance perspective, studying how ideas and emotions spread through networks.

Neurofinance attempts to investigate why and how emotional and psychological mistakes affect the decision-making of investors, leading to losses in the market. It is likewise visible from the few occasions that even small adjustments in the market result in crashes due to investors' overreactions who tend to make imprudent selections to chorus losing cash in place of focusing on the basics of the organization**[5].** Rather, emotions, which include greed and anxiety, play a vital role in decision-making **[6].**

The foundation at the back of Neurofinance is that behavioral biases have an effect on traders, and result in misinterpretation of records and defective conclusions even though the statistics are accurate**[7].** These behavioral biases gave birth to diverse investment strategies that take benefit of the irrational behavior of buyers. Although investment strategies encashing emotions have existed for the past few decades, Neurofinance concentrates on locating psychological mistakes repeatedly made with the aid of buyers**[8].**

Investors are impeccably rational, and Markets are perfect is the assumption according to the classical financial theory**[9].** The assumption of perfect markets has originated from the "Efficient Market Hypothesis" (also known as Random Walk Theory) which states that every time the latest information arises, it blows out so swiftly that stock prices instantly mirror the changes. Thus, no specific investment approach can deliver more than average returns as the effect of available information has already been exhibited in the share prices. Over the past few decades, several asset pricing models have been developed and tested including the Capital Asset Pricing Model (CAPM), Modigliani-Miller Theorem, and many more**[10].** All these models assumed that, as people in general give importance to money, they act rationally while making financial decisions. Although these traditional finance models have transformed finance research, they still do not explain many disparities left. Moreover, Traditional finance cannot justify various issues like the rate of return on the investment and, the reason behind the fluctuations of the markets if it is perfect**[11].**

According to the "Efficient Market Hypothesis," a market is efficient when it consists of an immense number of investors acting rationally, all of them attempting to anticipate the future market based on information**[12].** Moreover, investors tend to make decisions based on what they think is appropriate based on information that might be immaterial, diverging the actual share prices away from its fair value**[13].** On the other hand, various theories are attempting to explain the misconception of the Efficient Market Hypothesis but none of them is perfect**[14].** In practicality, share markets are neither perfect nor completely inefficient. However, some markets are efficient to a certain level, some less and some more than others. Although, CAPM, EMH, and other traditional finance theories helped a lot in anticipating and explaining various events. However, many popular events and anomalies is not taken under consideration by these traditional finance theories like the Bandwagon Effect, stock market crashes, dot com bubble Sub-prime mortgage crisis, January effect, Winner's Curse, etc**[15].** So we require a new theory that can explain the reasons behind these events. At the same time researchers in psychology found that while making financial investment decisions involving money, investors tend to behave irrationally**[16].** Subconscious errors and intense emotions can make investors make bad financial investment decisions**[17].**

Theoretical Foundations of Behavioral Finance

The theoretical foundations of behavioral finance rely on the psychology of investors when it come across information from any source**[18].** Sometimes investors rely on the information without checking the validity of the information and make an investment decision**[19].** Investment decisions made by the investors based on rational assumptions like Prospect Theory, framing effects, overconfidence bias, loss aversion, mental accounting, and the idea of limited arbitrage, which suggests that even when market inefficiencies exist, it might not always be profitable to exploit them due to market complexities**[20].**

Behavioral finance is the domain of the economy in which psychological biases like fear, greed, loss, reward, etc., are taken under consideration**[21].** Its analysis has a wide scope to understand different outcomes across various sectors and industries. It helps to understand the market anomalies, bubbles, the calendar effect, etc**[22].** It also helps to understand the types of investor personalities and skill sets of investment advisors. Identification of hedging strategies and the risk associated with them is another application of it. **Simon** in the world of economy and management is known for his interdisciplinary approach to the decision-making theory and, has given special attention to Simon's **"Bounded Rationality"** model and its relation to the process of decision-making**[23]. Festinger, Recken, and Schachter** in **1956** came up with **Cognitive Dissonance**, the psychological state where an individual experiences discomfort due to holding conflicting cognitions like; beliefs, attitudes, or behaviors that need to be changed. It significantly influences decision-making processes, as individuals strive to maintain internal consistency and avoid psychological discomfort**[24]. Tversky and Kahneman** in **1973 and 1974**, introduced the influence of **Heuristics [25]** such as representativeness, anchoring,

adjustment, and the concept of loss aversion bias in their 1979 **Prospect Theory[26].** Their work emphasizes how individuals make decisions based on cognitive shortcuts rather than rational analysis. **Richard Thaler's** give the concept of "Mental Accounting bias" in 1985, signifies the behaviour of individuals based on mental accounting for different financial goals and expenditures**[27]**. **Barberis, Shleifer, and Vishny (1998)** propose a model based on investor sentiment that explains under-reaction patterns and overreactions in stock prices**[28]**. **Meir Statman's,** Behavioural Asset Pricing Theory and Behavioural Portfolio Theory **(1999)** argue that standard financial models fail to represent the complexity of investor behaviour properly. By incorporating psychological insights, behavioural theories illustrate how biases, emotions, and individual aspirations influence asset prices and portfolio design[**29]**. **K. Tseng (2017)** analyzes the empirical data on stock market indexes to find out the developments and contributions of theories like the efficient market hypothesis, bounded rationality, behavioral finance, neurofinance, and the adaptive market hypothesis**[30].**

Theoretical Foundational of Neurofinance

Two major fields, behavioral finance and neuroscience lead the theoretical foundations of neurofinance. **Kahneman and Tversky's Prospect Theory (1979)**, which suggested that individuals view gains and losses differently, offers a fundamental behavioral underpinning**[31].** Neurofinance extends this with research into how the brain works in processing risk, uncertainty, and reward. Some of the early neuroscience research works were based on concepts developed by **Thaler (1985) and Shefrin (1988)** in loss aversion and mental accounting**[32].** It was only in the late 1990s, with the development of neuroimaging technology (fMRI), that the neural correlates of these behaviors were observed.

Neural Mechanisms of Financial Decision Making

Knutson et al. (2005) and Lo and Repin (2002), provided evidence that activity in the brain's reward system, especially within the nucleus accumbens, would be an essential component in regulating financial decision-making, especially behavior related to taking risks. The work of **Kuhnen and Knutson (2005)** also exemplified how responses vary for different parts of the brain-the insula-for instance prepared for expected losses, supporting a neural source for loss aversion**[33].**

The dual-process model suggested by **McClure et al., 2004** implies that the fast, emotional system and the slow, rational system in the brain guide decision-making**[34]. Sanfey et al. (2003)** experiments with the ultimatum game have shown the involvement of areas such as the anterior insula when one perceives a financial offer to be unfair; thus, how emotion can outmaneuver rational decision**[35].**

Cognitive Biases and Neural Responses

A significant amount of research in neurofinance show interrelation among cognitive biases as overconfidence, herding behavior, and the disposition effect, and their link to brain activity. **Bossaerts et al. (2009)** showed that overconfidence is linked with higher activation in the **ventromedial prefrontal cortex** (**vmPFC**), which is a region involved in subject-probability assessment**[36].** Herding behavior, as explained by **Baddeley(2010),** is based on the activation of social cognitive networks, such as the superior temporal sulcus and the medial prefrontal cortex, which have a close connection to the process of peer influence and social incentives**[37].**

Emotion and Financial Decision-Making

Emotions play a significant role in financial decision-making, as studies that examine emotional states such as fear, excitement, and regret have shown. **Lo and Repin (2002)** found that physiological measures of stress, such as heart rate variability, affect the performance of traders**[38].** In a similar study, **Zak, P., et al. (2005)** examined the role of oxytocin, a hormone linked to trust and empathy, in financial transactions, and found that higher levels of oxytocin were associated with greater financial trust in investment decisions.

Shiv et al. (2005) demonstrated that individuals with impaired emotional processing due to amygdala damage tend to make more consistent and rational financial decisions, which suggests that while emotions are important, they can also lead to less-than-desirable financial outcomes**[40].**

Risk Perception and Reward Processing

Neurofinance focuses highly on risk perception. Preuschoff et al. (2006) illustrated how fMRI activation occurs when the brain signals participants about predicting and managing risks through anterior cingulate cortex activity and dorsolateral prefrontal cortex activity**[41]. Knutson and Greer (2008)** furthered that work by showing how the brain processes potential gains and losses**[42].** Such research showed that the ventral striatum is activated in anticipation of financial rewards and that potential losses engage the anterior insula, indicating a neural dissociation in anticipated gains and losses.

Cultural and Socioeconomic Influences

Research into neurofinance, which was still a developing area of study, has now increasingly started to explore and

examine various cultural and socio-economic factors, which can actually have a great impact on financial decision-making processes. In one such comprehensive study conducted by **Henrich et al. (2005),** these researchers considered cross-cultural differences that prevail among the decision-making behaviors in the context of an economic game**[43].** Their findings from the experiments revealed that the decision-makers belonging to a collectivist culture, like East Asia, are highly loss-averse and more prone to cooperative financial behavior than those with individualistic traits, like the United States.

Socioeconomic status determines an individual's financial decision-making process, with a strong neural basis. According to **Peters and Büchel (2010),** people belonging to lower socioeconomic classes showed more activity in the specific brain areas related to uncertainty and risk when presented with financial choices**[44].** This evidence indicates that various environmental stressors, such as economic insecurity and instability, may heighten or enhance the neural activity associated with risk perception.

Applications of Neurofinance in Real-world Settings

Recently, neurofinance has rapidly increased its practical applications, especially into gaining deeper insights into market anomalies as well as the complexities involved in financial crises. In 2005, Lo introduced a new concept that he termed as the Adaptive Markets Hypothesis, where it is said that financial markets function more in a manner like biological ecosystems and not according to the efficient markets theory traditionally suggested in classical finance**[45].** According to this perspective, market participants are not static but modify and adapt their behavior in light of several evolutionary principles; key drivers in this context would be emotions like fear, greed, and other psychological factors, which are seen to play an important role in their decision-making processes. This is supported by neurofinance research, which shows that neural responses to extreme market events, such as financial crises, are more active in parts of the brain associated with fear and risk aversion, such as the amygdala. Their findings revealed that individuals who experienced greater fear during the crisis were less likely to take risks even after markets recovered, suggesting long-lasting neural impacts from financial turmoil.

Criticisms and Future Directions

While neurofinance has its merits, it has criticisms as well. For example, Petersen et al. (2012) forwarded an argument stating that the field is not mature enough with many studies possessing sample sizes that end up too small and heterogeneous**[46].** Critics have an opinion on neurofinance that perhaps it does too much of correlation-based findings and leaves the causality relationship ambiguous between neural activity and financial behavior.

Future research activities will focus on conducting longitudinal studies to track the development and variation of neural responses associated with financial decisions over a longer period. More than this, adding genetic information, for instance from neurogenomics, could provide a deeper insight into individual differences in diverse financial behaviors among many individuals.

Conclusion

Neurofinance has made tremendous progress in deepening our understanding of the complex ways in which emotions, cognitive biases, and other neural processes play a central role in shaping financial decision-making behaviors. By interlacing insights drawn from neuroscience, this new field actively challenges the long-held traditional view that casts investors as purely rational agents unencumbered by emotional influences. Instead, it brings to light the complex and dynamic interplay that exists between brain function and the multifaceted nature of financial behavior. Although methodological approaches are still challenging, and replication of findings is still a concern, neurofinance holds great promise and potential for revealing the underlying neural mechanisms that drive economic decisions and influence the dynamics of market behavior.

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