



BEHAVIOURAL ECONOMICS COMPREHENSIVE REVIEW: UNRAVELLING COGNITIVE BIASES AND EMOTIONS

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ABSTRACT

This paper provides an analysis of the paradigm shift brought about by the emergence of empirical findings in the field of behavioural economics, which challenged the neoclassical approach. Behavioural economics originated as an academic field that extensively drew inspiration from diverse social sciences in order to strengthen the theoretical frameworks applied by economists to human decision-making. The results of numerous cited studies have been synthesized in order to present psychological and neurological findings that contribute to the comprehension of behavioural variables. A concise overview of cognitive biases and their impact on the decision-making process is provided prior to delving into the "how" and "what" of emotions within the identical framework. This review focuses on two primary categories of emotions: incidental and integral. For each, the predominant discourse revolves around their role and impact on the process of making financial decisions. Subsequent to identifying domains that lend themselves to additional investigation, the review concludes by discussing the practical and conceptual consequences.

KEYWORDS: *human emotions, behavioural economics, neoclassical economics, rational decision-making.*

INTRODUCTION

The Nobel Memorial Prize in Economic Sciences not only acknowledges but also validates the significance of the contributions made by numerous non-economists to the field's theories through the paradigm shifts that these contributions have instigated. During the neoclassical era, economic models that were predominately computational and mathematical emphasized a simplistic perspective on decision-making. Driven by the satisficing heuristic proposed by Herbert Simon and additional empirical discoveries made by Kahneman and Tversky (Tversky & Kahneman, 1974; Kahneman et al., 1982), economics was compelled to reconsider its position and incorporate insights from other fields of study. In light of this development, the fields of psychology, sociology, anthropology, neuroscience, and political science have collectively contributed to the formation of a comprehensive comprehension of the process by which an individual makes decisions. This paper provides a comprehensive examination of the criticism directed towards the neoclassical paradigm, the paradigm shift brought about by the emergence of empirical findings in behavioral economics, and the ways in which emotions enhance and contribute to our theoretical frameworks pertaining to financial decision-making.

BACKDROP OF NEOCLASSICAL ECONOMICS

A basic assumption in the study of modern financial management is that individuals act with complete rationality. Individuals are modelled on the basis of decision-maker qualities that a *Homo economicus*, or "economic man," would possess, making efficient choices by using rational judgment. Here, rationality means functioning in ways that are internally consistent, not necessarily being sensible or reasonable. The *homo economicus* concept bears three basic assumptions to the effect that companies maximize profits and people maximize utility, people make decisions based on full and available information, and people have a rational choice regarding outcomes (Aktipis, & Kurzban, 2005; Orrell, 2021).

The notion of *homo economicus* serves as the foundation and framework for neoclassical economics. The primary theories that compose the neoclassical paradigm in economics, like the consumer choice theory (utility maximization, theory of the firm (profit maximization), welfare theorems, industrial organization, all state the foundational assumption that various agents behave in accordance to the tenets of individualistic rational optimization (Urbina & Ruiz-Villaverde, 2019). Most financial theories, like the efficient market hypothesis or



the modern portfolio theory, derived from these neoclassical theories, thus, also assume that people behave with extreme rationality (Singh, 2019). One example is the Efficient Market Hypothesis (EMH), a theory that asserts the efficiency of markets in terms of price creation, suggesting that prices accurately reflect all relevant information that is always accessible. The fundamental tenets of the Efficient Market Hypothesis (EMH) revolve around the notion of perfect market assumptions. In an idealised market scenario, transaction costs are absent, information is readily available at no cost, investors possess uniform expectations, exhibit rational behaviour, and thus, markets operate with efficiency. According to Singh (2019), an efficient market is characterised by the complete incorporation of all relevant information into the pricing of assets. Economists have traditionally posited, for the sake of model simplicity, that individuals engage in rational decision-making with the objective of optimising their utility, which encompasses happiness or pleasure.

ADVENT OF BEHAVIOURAL ECONOMICS

The financial crisis triggered in 2007 revealed that there is a significant gap between dominant economic theories and economic reality (Josan & Voicu, 2013). When the neoclassical models were actually assessed for their predictability in relevant contexts of financial judgements and decision making, they seemed to be inadequate. Although the failure of economists to predict the crisis was not unusual, what was deemed to be surprising was that the theoretical models used turned not just untrue but also catalysts for the crisis as fundamental ideas underlying these models were wrong (Orrell, 2010). As noted by Orrell, the problem was not just incorrect mathematical models used by economists but also the mental models that were utilized (Orrell, 2010). Thus, models with an aim to explain human behaviour in themselves lacked a complete understanding of human behaviour and resorted to tagging that which remained unexplained as “anomalous” (Bresser-Pereira, 2010; King, 2009). An IMF study of 72 recessions in 63 countries found that in only four of these cases had economic forecasters predicted a recession three months or more before the event (Kaletsky, 2009).

Global systemic crisis of capitalism that began in 2007 highlighted the need for a new economic paradigm, in line with the increasingly complex realities of a globalized and quick changing world (Josan & Voicu, 2013). Behavioural economics is a revolutionary method that emerged as a result of economists' inability to forecast the “rational” acts of “rational” individuals. Behavioural economics is an approach that aims to enhance the realism of economic analysis by incorporating many rational psychological concepts. By doing so, it aims to produce fresh theoretical ideas, improve field phenomenon forecasts, and offer better policy recommendations (Orrell, 2021; Singh, 2019; Urbina & Ruiz-Villaverde, 2019).

Herbert A. Simon, in his works published in 1947 and 1955, emerged as a prominent figure during the first stage of behavioural economics. He critically examined the notion of homo economicus and its presumed state of absolute rationality. Simon emphasised the need of considering individuals' cognitive and noncognitive limitations while examining the decision-making process. For example, while considering cognitive boundaries within the decision-making process, it is important to consider the capacity of the human mind to retain, evaluate, and retrieve information, as well as its susceptibility to the effect of an individual's knowledge and experience. Noncognitive factors, such as cultural influences, emotional states, and the tendency to imitate others, can also impose limitations on an individual's reasoning. The assumption of bounded rationality, posits that the pursuit of satisfaction, rather than optimisation, serves as the central motivation in the examination of rational decision-making. Consequently, this notion has been included into economic models.

The psychological tenet of selective rationality served as the foundation for Leibenstein's (1976, 1978) research. He argues that individuals, rather than striving to maximise outcomes from a set of choices, choose the degree of their responses to various possibilities and constraints depending on their personal characteristics and external factors. Studies conducted by Kahneman and Tversky undermined the standard model's assumption that people's preferences are stable, by demonstrating preference reversals that cannot be explained by any reasonable reading of rational choice theory (Aktipis & Kurzban, 2005). They discovered that individuals, when making decisions, systematically appeal to heuristics (mental shortcuts), which allow assessments based on partial data (Tversky & Kahneman, 1974; Kahneman et al., 1982).

A number of experiments have shown that people choose between various options based on the way in which the information is presented. For instance, Shane Frederick (2005) showed through his Cognitive Reflection Test that people are often misled by the problem's surface-level characteristics that they believe to be pertinent to the solution. Decisions may be influenced by the framing of a financial scenario, which has no bearing on its actual value (De Martino, Kumaran, Seymour, & Dolan, 2006; Sonnemann, Camerer, Fox, & Langer, 2013). People also have a tendency to be loss averse; they take more chances to avoid losing money than to make it. Traders may be overly risk averse or overconfident in the outcome (i.e., mistakenly gauge risk) to take the chances required for maximum benefit. The actions of others or erroneous or partial information may have an undue



influence on them (herding; Devenow & Welch, 1996). Availability bias occurs when individuals excessively rely on information that is easily accessible. Despite the fundamental concepts of so-called diversity of portfolio management for optimisation, this bias is manifested in the stock market by the preference for investing in local businesses that investors are familiar with or can quickly access information about (Waweru et al., 2003). Estimates of success or failure may be influenced by social factors, such as social status, temporal discounting, or unrelated financial demands (Frydman & Camerer, 2016).

EMOTIONS AND THEIR INFLUENCE ON FINANCIAL DECISION-MAKING

Kahneman and Frederick (2002) in their dual-process theory, theorised two distinct processes of reasoning that compete for control of the response that participants make in reasoning tasks. Heuristic or System 1 processes are characterised as rapid, implicit, associative, and heavily contextualised, whereas analytic or System 2 processes are described as slow and sequential but capable of abstraction and generalisation (Kahneman & Frederick, 2002; Pinker, 2022; Aktipis, & Kurzban, 2005). Emotions were once thought to be inferior to a purely logical approach, yet there is increasing evidence that emotions include a cognitive component. For instance, situations that cause fear or worry also cause people to evaluate the situation's importance cognitively. The upshot is the realisation that cognitive and emotional processes are so tightly integrated that it is impossible to separate them (Davidson, Schere, & Goldsmith, 2003; Fox, 2018). This line of inquiry tries to align the findings of heuristics and biases with emotions and their influence on information processing and furthermore, judgement and decision-making.

Emotion can be defined loosely as a physiological state of arousal triggered by beliefs about something (Elster, 1998). Every individual maintains a subjective evaluation of the quality or desirability of an object or condition. Emotions possess an evaluative nature as they elicit either positive or negative valences, which may be characterised by bipolar scales that establish a continuous spectrum ranging from unpleasantness to pleasantness. This spectrum can be exemplified by contrasting emotions such as unhappiness and happiness, or pessimism and optimism (Bradley & Lang, 2000; Ackert, Church, & Deaves, 2003).

Emotions may sometimes act "against us" by biasing our decisions when, for example, they render us not sensitive enough to probability changes or stimulate an incorrect understanding of the relation between expected risks and benefits (Slovic, Finucane, Peters, & MacGregor, 2007). Nevertheless, emotions also serve as valuable informational mechanisms, such as informing us whether a particular course of action is safe and, in this way, adaptively discouraging us from taking unnecessary risks (Baumeister et al., 2007).

Theoretical perspectives to Emotions and Financial Decision-Making

In his seminal work, "The General Theory of Employment, Interest, and Money" published in 1936, Keynes expounded upon the concept of animal spirits, which he defined as the human emotions that exert an influence on consumer confidence. Keynes (1936) introduced the concept of "animal spirits" as a means to elucidate the decision-making processes of individuals in the realm of finance, particularly during periods characterised by economic strain and ambiguity. The emotional state of an individual has the potential to impact their financial decision-making process. For example, a someone who experiences a positive emotional state as a result of previous events or their current living circumstances employs this optimistic mindset when approaching the given work. According to the research conducted by Ashby, Isen, and Turken (1999), it is posited that a cheerful mood has a beneficial impact on an individual's cognitive performance across many activities. The hypothesis that happy mood enhances people's ability to organise and assimilate information and promotes creative problem-solving is well-supported by a substantial body of literature (Ashby et al., 1999).

There are various studies focusing on the effect of emotions on investment decisions. There is evidence that biased (e.g. framing-related) financial decisions are associated with activation of the amygdala, part of the brain known to be concerned with emotion, whereas cortical activation (anterior cingulate) are triggered by those not influenced by framing, suggesting neural separation of the two decision making processes (De Martino et al., 2006). The possibility of losing something can deter us from engaging in certain behaviours since humans are risk-averse. Our urge to refrain from risky behaviour initially appears to be reasonable. On the other hand, we overestimate the risk that truly exists and overreact in terms of aversion. Our fear of losing something might skew our judgement and prevent us from making decisions (Ackert et al., 2003).

Anxiety and fear possess sufficient intensity to hinder our capacity for logical decision-making and prompt us to opt for a more precarious course of action. The *risk-as-feelings theory* posits that emotions play a significant role in shaping decision-making processes. Based on the prospect theory proposed by Tversky and Kahneman (1970), individuals tend to exhibit risk-averse behaviour when confronted with situations involving potential monetary losses, since their aversion to losing money outweighs their inclination towards gaining it.



Emotions are therefore seen as expected outcomes of a decision within the framework of prospect theory (Loewenstein, Weber, Hsee, & Welch, 2001).

George Loewenstein, however, asserted in 2001 that anticipation-related emotions, or anticipatory emotions, can potentially affect decision-making. In his paper "Risk as Feelings," Loewenstein criticized current theories of choice for not taking emotions into account and focusing only on cognitive factors, or for being consequentialist with their interrogation of emotions, like the prospect theory (Loewenstein et al., 2001).

From the standpoint of their origin and control over financial decision-making, research primarily focuses on two major groups of emotions: incidental and integral emotions. Integral emotions result from the challenge at hand and can either be experienced right away when choosing or predicted as a possible emotional result of choosing. Incidental emotions (affects or moods) do not influence decisions; rather, they support the influence on decision-making.

Integral Emotions and Their Functions

First, emotions might be a particular kind of knowledge that aids in making decisions. Integral emotions that come with a decision-making process are typically generated based on prior experience (Bechara et al., 2005; Damasio, 1994), and they normally work implicitly and inadvertently. A decision maker becomes familiar with the environment's structure (such as payoffs and their probability) and "marks" mental representations of the decision problem with favourable or unfavourable emotions based on the present bodily states. Such somatic states, also known as markers (Bechara & Damasio, 2005), may serve as an alarm system, preventing a decision-maker from selecting options that were previously unfavourable. For example, recent research showed that people who personally experienced a natural disaster felt more worried about the future and, consequently, were more likely to pay more for insurance on their property (Sobkow et al., 2017).

Second, emotions translate more complex thoughts into simpler affective evaluations and help to integrate information (Peters et al., 2006). Even though alternatives and their qualities seem incomparable to one another (such as money vs. health vs. time), they supply "common currency" (the sensation of goodness or badness). Third, emotions might act as a spotlight (Peters et al., 2006), which would increase the accessibility of information that is consistent with the current emotional state. By concentrating attention on particular parts of a decision, they also change how information is processed (Wichary, Mata, & Rieskamp, 2016). For instance, the negative affect sparked by thinking about volatile and new stocks can draw attention to specifics regarding the liquidity of the company one is planning to invest in. Investors as a result conduct more extensive information analysis, which ultimately results in better decisions. Additionally, emotions encourage decision-makers to devote more time to analysing the relevant data (Peters et al., 2006). For instance, it has been shown that those who reported more dread being aroused by a decision-making process (for instance, while choosing between financial and medical options) checked out more information about possible outcomes and their probabilities.

However, as was previously indicated, integral affect may, in some circumstances, be deceptive when used to make financial judgements. In their investigation of some monetary lotteries, Rottenstreich and Hsee (2001) offered proof to back up this assertion. These authors made the supposition that how information regarding a choice problem was presented would have an impact on how sensitive people were to probabilities while making financial judgements. The researchers made a particular prediction that choice problems presented in affect-rich vs affect-poor ways would lead to reduced sensitivity to changes in probability. In one of their investigations, the individuals were randomly assigned to one of the four between-subject conditions. The latter portion of the participants were informed that they had a 99% likelihood of receiving a \$500 voucher, whereas the former portion of participants were informed that they would engage in a lottery with a 1% possibility of obtaining the identical coupon. Moreover, it should be noted that half of the participants were randomly assigned to one of two groups, with each group being informed about the potential use of the coupon for different purposes. Specifically, one group was informed that the coupon might be utilised to cover expenditures related to summer travel in Europe, thus creating an affect-rich condition. Conversely, the other group was informed that the coupon could be used to pay for college tuition, so establishing an affect-poor condition. Each participant was requested to specify the monetary amount at which they would need to be compensated in order to exhibit an equivalent level of interest in either winning \$500 through a lottery with a predetermined probability, or getting the same amount with certainty. The findings showed that even while the actual cost of the coupon was the same in both conditions, participants were less sensitive to changes in the probability of receiving a coupon from 1% to 99% in the affect-rich condition. According to this research, emotions that are integral to a decision problem but unhelpful in terms of effectively solving it influenced the decision-making through erroneous processing of the probabilities (Rottenstreich & Hsee, 2001).

Upon examination of the cumulative results presented in this section, it becomes apparent that intrinsic emotions often provide significant benefits to the process of making financial decisions. Emotions have a vital



role as a signal that enhances the accuracy of decision-making when they provide valuable information, specifically when they are appropriately elicited by certain aspects of a choice situation, such as the likelihood involved. Nevertheless, in cases when these emotions are not relevant to the decision-making process (such as instances where negative emotions are influenced by inaccurate information or persuasive marketing tactics), they have a greater likelihood of influencing judgement and resulting in suboptimal decisions.

Incidental emotions and their effect

Incidental emotions have nothing to do with a decision problem or the decision-making process, either directly or indirectly. In other words, even when they are normatively unrelated to a decision, they transfer over from other circumstances or internal states to it (Lerner et al., 2015; Västfjäll et al., 2016). Incidental emotions may skew judgements, preferences, and decisions in the future. The groundbreaking study by Johnson and Tversky (1983) provided evidence of this phenomena. In this study, participants were instructed to read several newspaper articles that were intended to elicit either good or negative feelings. After that, participants were asked to rank the frequency of dangers (like a flood) that were either similar to the news article they had read (natural calamities) or not (like infections). According to the findings, participants who read negative stories rated risks more pessimistically than those who read good stories. The results of this study indicate that the emotions evoked by a newspaper article have an impact on the perception of risk, regardless of whether the emotions are congruent with the source of the hazard being evaluated. It is interesting to note that this effect was not moderated by the similarity between the content of the story and the rated risk (Johnson & Tversky, 1983).

Several studies have demonstrated that incidental affect that is not causally related to a decision itself may influence processing probabilities by distorting decision weights (Fehr-Duda, Epper, Bruhin, & Schubert, 2011; Kliger & Levy, 2008; Traczyk & Fulawka, 2016). That is, by making people less sensitive to changes in probability, feelings, affect, or mood may have an impact on subsequent financial decisions. Incidental affect reduces the desire to thoroughly absorb information that is relevant to making decisions, thus, it is likely to affect decision-making. Consider the situation of an investor who is debating between safer bonds and riskier stocks. Making a rationale decision in this situation would entail analysing data on the volatility of stock prices, portfolio diversification, bond ratings, etc. However, incidental emotions that are unrelated to the investment, such as regret over a pet's passing or a fear of flying, are likely to cut into the amount of time we expect to spend deliberating. Such an effect has been observed in empirical research; this outcome showed that negative incidental affect (e.g., emotional stress) narrowed attention, which resulted in a limited information search about a decision problem and using simpler choice strategies in comparison to a control condition (Wichary et al., 2016).

The skewing impact of incidental emotions on financial decision-making may be caused by both distortions in the way probabilities are processed and a lack of time to process all necessary information. Furthermore, strong and specific stimuli or situations do not cause mood shifts (unlike meeting an angry dog, which causes tremendous fear). Biological or environmental variables have the propensity to cause these alterations. Independent of its exact source, mood can be viewed as a particular category of incidental emotion that affects the assessments, anticipations, and preferences of financial decision-makers. Hirshleifer and Shumway (2003) looked at the daily returns in 26 stock markets around the world and discovered that sunny days had higher returns than cloudy days did. In other words, sunny days performed over 25% better than cloudy days annually. Similar to this, Kamstra et al. (2003) looked at the potential impacts of the so-called "winter blues" (a negative change in mood during the shorter days of winter) on stock market outcomes in different nations. They discovered that throughout fall, when daylight is lessening, stock returns were much lower. This result confirmed the hypothesis that people's financial decisions are influenced by negative moods brought on by external factors. It's interesting to note that these impacts affect both professional (institutional investors) and individual investors, who were shown to be more critical of stock price on days with terrible weather, demonstrating a larger disposition to sell (Goetzmann, Kim, Kumar, & Wang, 2015).

CONCLUSION AND FUTURE DIRECTIONS

Humans are now in an age which provides individuals with access to unprecedented tools for rational thinking, yet, the public realm is plagued with misinformation, disinformation, quack cures, conspiracy theories, and a "post-truth" discourse wherein "alternative facts" readily replace facts and sentiments overrule evidence (Pinker, 2022). This makes it all the more important to study the all-pervasive effects of emotions.

This article covers studies that indicate that although emotion plays a substantial role in influencing financial behaviour, it does not consistently seem to impair rational decision-making. This validated the pressing need for a novel paradigm that integrates behavioural factors and more accurately replicates real-world phenomena.



Cultural differences in the way that cognitive and emotional biases manifest would also prove to be interesting. Furthermore, the influence of universal emotions can be tested in investment, saving, borrowing, or lending preferences. Importantly, men historically predominated the banking business, and they still do so to some level, hence the majority of the research that is currently available has a narrow sample. While there is a wealth of information on market research that examines the factors and biases that affect the domestic financial decision-making of females, even though this trend is steadily changing, there has been little effort to look into any of the physiological factors that might affect these decisions. Therefore, future research is possible in various related areas with implications that can be applied to various fields of finance and investment.

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