

## Research Article

# Positioning Herbert Simon within Behavioral Finance

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This article aims to discuss Herbert Simon's contributions to behavioral finance. In addition to a critique of *homo economicus*, the article addressed the concepts of bounded rationality, satisficing, heuristics, and intuition. The discussion highlights how Simon's ideas are compatible with those of prominent authors of behavioral finance, consequently supporting the positioning of the author within this field. It contributes by emphasizing the concept of intuition proposed by Simon.

Although little explored in the literature, this concept of intuition applies to circumstances in the practice of investing. Furthermore, the article presents examples that illustrate the adherence of Simon's concepts to the context of investments. Finally, it can encourage further study of Herbert Simon's concepts in behavioral finance.

## 1. Introduction

In 1978, Herbert A. Simon received the Nobel Memorial Prize in Economic Sciences for his pioneering contributions in explaining how decision-making occurs in organizations. Although his extensive production of knowledge has influenced various scientific fields, Simon gained notoriety in economics and finance for presenting important concepts regarding decision-making, especially bounded rationality, and satisficing. Simon's ideas contradict the orthodox or neoclassical assumptions made in various theories of these fields. The author was a notable critic of these assumptions<sup>[1]</sup>.

In economics, Herbert Simon's contributions occurred in terms of various concepts dispersed throughout his works. As soon as Simon received the Nobel Prize, Baumol<sup>[2]</sup> and Ando<sup>[3]</sup> gathered these contributions in complementary reviews. Hosseini<sup>[4]</sup> offers an in-depth historical investigation of how Simon's ideas are associated with behavioral economics. Despite this, more modern studies have dealt little with these concepts. Kao and Velupillai<sup>[5]</sup> classify behavioral economics as modern

and classical. Modern behavioral economics maintains the idea of rational agents maximizing utility (satisfaction), although with some modifications attributed to psychological aspects. Classical behavioral economics assumes that agents have bounded rationality and are subject to satisficing behavior (they do not aim to maximize satisfaction). These authors attribute a central role to Simon in classical behavioral economics. Similarly, Chapman and Pike<sup>[6]</sup> and Avtonomov and Avtonomov<sup>[7]</sup> position Simon as a pioneer in behavioral economics.

Specifically in the field of behavioral finance<sup>1</sup>, Fronlet<sup>[8]</sup> focuses on presenting Herbert Simon's critique of theories established considering the behavior of the *homo economicus*. The author treats Simon's ideas as a rupture with orthodox or neoclassical theories. Such rupture made other advances possible, which Fronlet<sup>[8]</sup> focused on. In addition to addressing this criticism, Ackert<sup>[9]</sup> expands the discussion of bounded rationality and satisficing.

Although these previous studies have already addressed some of Herbert Simon's ideas in behavioral finance, it is still possible to reorganize and discuss the knowledge produced by the author. There are even concepts that previous studies within this field have not explored, such as Simon's idea of intuition<sup>[10][11]</sup>. Furthermore, Lo<sup>[12]</sup> states that the concept of satisficing still needs more attention in behavioral finance. It is interesting to remember that Simon<sup>[13]</sup> argued that researchers are not exempt from a cognitive capacity that prevents them from capturing all available information. This fact also has implications for the literature reviews.

Simon<sup>[14][13]</sup> should be considered a pioneer in describing the use of heuristics in human decisions. However, studies often point out these cognitive processes as particular theoretical contributions of Tversky and Kahneman<sup>[15]</sup>. We do not intend to question whether this duo of authors is really a precursor in behavioral finance. Certainly, it consolidated a significant part of the foundations of this field. Even so, it is relevant to highlight that Simon<sup>[14][13]</sup> described heuristics long before the referred duo.

In the same line of thought, van der Sar<sup>[16]</sup> argues that Herbert Simon is a pioneer in behavioral finance, although he only briefly mentions the concepts of bounded rationality and satisficing. In contrast, some more recent literature reviews (e.g., Shefrin<sup>[17]</sup>, Barberis & Thaler<sup>[18]</sup>) have given no attention to Simon's contributions to the foundations of behavioral finance. Therefore, it still seems necessary to highlight these contributions within this field.

This article aims to discuss Herbert Simon's contributions to behavioral finance. The discussion emphasizes how Simon's ideas are compatible with those of prominent authors of behavioral finance, consequently supporting the positioning of the author within this field. In addition, it contributes by emphasizing the concept of intuition as proposed by Simon<sup>[11]</sup>. Although little explored in the literature, the concept of intuition applies to circumstances in the practice of investing. The article presents examples that illustrate the adherence of Simon's concepts to the context of investments. Finally, it can encourage further study of Herbert Simon's concepts in behavioral finance.

The next sections of this article discuss, respectively, the critique of *homo economicus*, and the concepts of bounded rationality, satisficing, intuition, and heuristics. Then, we present a conclusion.

## 2. Critique to *Homo Economicus*

In neoclassical or orthodox economics, man is represented as *homo economicus*, behaving in a way that maximizes utility. He is perfectly rational, always guided by his own interests, and has all the information available to make decisions<sup>[8]</sup>. However, we can question whether this is really the standard behavior of the man we encounter in everyday life. The decision-maker we meet daily is not always correct, nor does he act consistently to achieve maximum performance. Therefore, there is a mismatch between theory and observed reality.

Simon<sup>[14]</sup> criticized this unrealistic way of viewing human behavior. He advocated the development of empirically testable theories that would show how agents really make decisions. In contrast, Friedman<sup>[19]</sup> argued that complete realism is unattainable in science since would be needed infinite variables for a theoretical model to capture all characteristics of reality. However, instead of discussing the number of variables, Simon<sup>[14]</sup> recommends developing theoretical models closer to reality by abandoning unrealistic assumptions.

In finance, an example of assumptions that do not align with reality comes from Markowitz<sup>[20]</sup>, who assumes that investors maximize the expected return on assets and minimize their risk by choosing a portfolio that optimizes this relationship. However, this optimization is unlikely in the real world. Based on Simon's<sup>[14]</sup> ideas, Sbicca<sup>[21]</sup> states that if the environment changes and multiple objectives or internal conflicts afflict the organism, the adoption of the concept of maximization is not appropriate. For example, Egan<sup>[22]</sup> mentions that brokers (financial advisors) influence retail

investors to buy inferior products with high brokerages. Hence, in this situation, investors do not maximize their returns.

Markowitz<sup>[20]</sup> did not intend to apply the theory in practice, as he understood that each investor would have their own risk tolerance. However, he recommends that those who wish to apply his theory should seek the support of mathematical tools that facilitate the optimization of portfolios. The maximization could even be approximated today by computer applications that use a wide range of financial information available in real time on the internet. Simon<sup>[11]</sup> predicted that, in the future, agents could use computer resources in decision-making. However, he was also aware of the technological limits, as in the passage where he referred to bounded rationality as the “rational choice that takes into account the cognitive limitations of the decision-maker – limitations of both knowledge and computational capacity”<sup>[23]</sup>. It is worth asking whether, in the past, investors would have had access to all the available information needed to calculate the correlations that maximize return and minimize risk, as proposed by Markowitz<sup>[20]</sup>. At that time, computers did not even exist. Even today, financial data platforms with interactive tools that allow users to obtain information and make decisions quickly are more limited to institutional investors.

### 3. Bounded Rationality

From Simon's<sup>[14]</sup> perspective, human rationality is limited, i.e., cognitive and time constraints do not allow humans to access all the information available about a phenomenon. According to this author, decision-making in organizations consists of choosing, among the available alternatives, the one that results in the most desirable set of consequences. As he advocates, the manager is responsible for selecting the effective means to achieve the ends. However, he argues that knowledge of all the alternatives (the means) and their sets of consequences (the ends) is unlikely in many real situations.

Simon<sup>[14]</sup> defines strategy as the set of knowledge about possible alternatives. A rational decision would be based on the consequences of that strategy. The function of knowledge in decision-making processes is to recognize the future consequences of the strategy. However, he understands these consequences as aspirations since human cognition fails to grasp all the information, or this input for decisions is not even fully disseminated. According to Simon<sup>[24]</sup>, humans live in an environment that generates millions of bits of information at any given moment, but the cognitive capacity of humans is limited, not allowing them to process more than 1,000 bits per second. With this in mind, bounded

rationality means that individuals' decisions are not always optimal in terms of the intended consequences. Simon<sup>[14]</sup> highlights three factors limiting human rationality: i) the imperfection of knowledge, ii) the difficulty in predicting consequences, and iii) a fragmented view of possible strategies.

Consistent with Simon's<sup>[14]</sup> concept of bounded rationality, individual investors cannot pay attention to all available information about the companies in the market. Instead, these investors may buy or sell stocks widely publicized in the news or recommended by financial analysts, ignoring fundamental information such as complete financial statements. While discussing the investment decisions of individual investors, Barber and Odean<sup>[25]</sup> seem to describe Simon's<sup>[14]</sup> concept of bounded rationality. These authors state that humans have a bounded rationality, which limits the amount of information they can process. For this reason, they argue that investors tend to focus on those stocks that attract attention.

Simon's<sup>[14]</sup> concept of bounded rationality also seems to contradict the idea of efficient capital markets. This idea was widely discussed in Fama's studies<sup>[26][27][28][29]</sup>. According to this author, the price of each share moves over time like a random walk, responding to all new information made available to the market. The reaction to information would lead to the pricing according to the intrinsic value<sup>[29]</sup>. When Fama<sup>[28]</sup> states that the price of assets responds to all the information available on the market, we understand that this price is the result of investors buying (demand side) and selling (supply side) assets. In reality, investors require information to judge asset prices. However, for Simon<sup>[14]</sup>, the cognitive limits of individuals preclude them from capturing all the existing information. In this sense, bounded rationality is a concept that opposes efficiency in the stock market. It is worth mentioning that the opposition to the idea of efficient capital markets is typical of the recent behavioral finance literature (e.g., Shiller<sup>[30]</sup>), denoting the alignment of Herbert Simon with this field.

## 4. Satisficing

Due to limited rationality, humans have difficulty achieving optimal consequences. Instead, they seek satisfactory consequences. This statement is the essence of the idea of satisficing that first appeared in Simon<sup>[31]</sup>. Simon<sup>[14]</sup> used the term satisficing to describe decision-making when individuals cannot delineate the optimal consequences. Accordingly, there is no known ideal solution but rather a level of

aspiration to achieve. In cognitive psychology, satisficing is a decision-making strategy that involves choosing alternatives based on a satisfactory threshold<sup>[32]</sup>.

Bringing the idea of satisficing into the context of investment decisions, we can imagine a strategy for allocating assets aiming to achieve a specific return. In this situation, we can understand optimization or maximization as achieving the highest possible return on an investment strategy. However, achieving this optimal return seems unlikely. The fund manager may not even know it because knowing the maximum return when managing portfolios of volatile assets is so difficult. It is more reasonable to establish satisfactory targets. For example, investment funds establish satisfactory targets that their portfolio managers must achieve. These targets do not correspond to the highest possible returns but to results that exceed the returns of low-risk assets by a pre-established percentage. It is also common practice to compare the returns with those of a market index. In fact, Simon<sup>[24]</sup> speaks of evaluating alternatives in relation to a target when dealing with logical decisions, as opposed to decisions by judgment. Bajeux-Besnainou and Ogunc<sup>[33]</sup> contrast Simon's<sup>[31][14]</sup> idea of satisficing with Markowitz's<sup>[20]</sup> assumption of maximization, but without presenting a practical example, such as the mentioned targets of investment funds.

Several studies have documented that investors have limited attention, which leads to systematic errors that affect stock prices<sup>[34][35][36][37]</sup>. Hirshleifer et al.<sup>[36]</sup> provide an example of this limited attention that consists of investors focusing on a limited amount of information when evaluating stocks. In particular, Hirshleifer et al.<sup>[36]</sup> state that due to limited attention, investors rely on heuristics, making decisions that result in suboptimal performance. Looking at this description presented by authors known for their work in behavioral finance, Basu<sup>[38]</sup> associates it with Simon's<sup>[24]</sup> concept of satisficing. Such association denotes an alignment of Herbert Simon's ideas with those of more recent behavioral finance authors.

Soon after being awarded the most important prize in economics, Simon<sup>[39]</sup> stated that "decision makers can satisfice either by finding optimum solutions for a simplified world or by finding satisfactory solutions for a more realistic world. Neither approach, in general, dominates the other, and both have continued to co-exist in the world of management science". This statement suggests a more cautious tone about confronting his ideas with neoclassical assumptions. However, in the decades before the award, Herbert Simon often adopted a critical posture, arguing that researchers should adopt more realistic assumptions and prioritize solutions for concrete problems (e.g.,

Simon<sup>[40]</sup>). Simon<sup>[11]</sup> again defended the need for empirically validated theories, including statements on how humans make investment decisions.

## 5. Intuition

Simon<sup>[10][11]</sup> classifies decision-making into two types: logical and judgmental. In logical decision-making, the goals and alternatives are clearly defined, and the consequences of different alternatives are calculated and evaluated in terms of how close they are to the established goals<sup>[11]</sup>. Judgmental decisions, on the other hand, take place too quickly to allow a sequential analysis of the alternatives and their possible consequences. In many cases, such decisions do not even allow for the formulation of strategies because the alternatives are not clearly defined. Therefore, it is difficult to report on the process that led the individual to the decision.

Simon<sup>[11]</sup> argued that experts possess a unique ability that allows them to make decisions quickly and effectively, especially when they lack the time or necessary informational resources for logical decision-making. When experts make decisions based on judgment, they rely on intuition. According to Simon<sup>[11]</sup>, intuition is an integral part of human knowledge. It consists of the ability to recognize patterns, interpret them as suggestions, and associate them with previous experiences. This association makes it possible to retrieve relevant actions from memory. According to Simon<sup>[41]</sup>, “the human memory is organized like a very well indexed encyclopedia. Perceptual cues are the index items, which give access to stored information about the scene perceived and about relevant actions”.

Simon<sup>[11]</sup> presents a concept of intuition that applies to any specialist, although he also refers to specific specialists in his article. Hence, it is reasonable to transpose this idea to the context of investments. When analyzing stock investments, portfolio managers follow rigorous and well-defined strategies based on fundamental or technical analysis<sup>[42][43]</sup>. When this rigor is fully applied, the decision can be considered logical, according to Simon’s<sup>[10][11]</sup> concept. However, portfolio managers face situations where they must decide quickly, especially when working with technical analysis. In such circumstances, they often resort to intuition. Simon<sup>[11]</sup> points out that intuition is not a process that operates independently of analysis. Instead, intuition and analysis are essential and complementary components of effective decision-making. For example, the intuition of stock market traders can originate from the experience acquired through monitoring prices, which includes recognizing graphical patterns characteristic of technical analysis. Although some of these patterns do

not have rigorous logical (scientific) explanations, they function as signals that allow traders to form expectations about future price variations. Based on these signals, traders can decide to buy or sell shares.

In line with this illustrative example, and referencing a phrase he attributes to Samuelson and Nordhaus<sup>[44]</sup>, Fromlet<sup>[8]</sup> also points out that portfolio managers use intuition in selecting stocks and bonds, although analytical approaches can also influence the decision. However, this author does not explore Simon's<sup>[11]</sup> concept of intuition in greater depth.

Simon's<sup>[10][11]</sup> distinction between logical and judgmental decisions is very similar to Kahneman's<sup>[45]</sup> central idea in the book *Thinking, Fast and Slow*. Kahneman describes two different ways of thinking: one that is fast, intuitive, and emotional (System 1) and another that is slower, deliberative, and logical (System 2). Daniel Kahneman is one of the most influential authors of behavioral finance. Therefore, the similarity between the ideas supports the positioning of Herbert Simon within the same field as Daniel Kahneman.

## 6. Heuristics

Heuristics are cognitive processes that function as mental shortcuts or simplifications in decision-making. Simon<sup>[14][13]</sup> was one of the first authors to address the concept of heuristics in the context of economic decision-making. His idea of satisficing can be understood as a heuristic because it facilitates setting a desirable level of consequences for a decision without that level having an exact point. However, heuristics gained broader recognition in behavioral finance after Kahneman, Slovic, and Tversky<sup>[46]</sup> and Tversky and Kahneman<sup>[15]</sup>. These studies focused more on these cognitive processes than on other psychological issues.

Simon<sup>[13]</sup> describes heuristics as a search process with specific rules that individuals use to identify possible alternatives in decision-making. According to the author, the number of options that decision-makers can identify for complex issues is much lower than the total number of options available due to the limits of cognition (bounded rationality). Thus, the world is simplified and made artificial by internal rules that lead the individual to consider only a limited number of alternatives. The individual decides when he encounters an alternative whose consequences are satisfactory (satisficing). Therefore, Simon's<sup>[14][13]</sup> idea of heuristics is closely related to bounded rationality and satisficing.



From Simon's<sup>[13]</sup> perspective, we can understand that the value investing strategy relies on heuristics in investment decisions. This understanding derives from the fact that this strategy focuses on a limited number of valuation ratios used to evaluate companies' shares rather than considering all the information available about the companies. In this approach, portfolio managers focus on the most relevant indicators for their buy or sell decisions, even though the complex reality involves many other factors that might influence stock performance<sup>[4,7][4,8]</sup>. In addition, portfolio managers can use intuition to decide the exact moment to buy stocks in the market, even when considering valuation ratios in a value investing strategy.

Simon's<sup>[13]</sup> perspective on heuristics shares similarities with that of Tversky and Kahneman<sup>[4,9]</sup>, who state that “people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations”. However, the studies of Daniel Kahneman and Amos Tversky advanced on the study of various specific biases and heuristics, often adopting experimental methods typical of the cognitive psychology approach<sup>[50][4,6]</sup><sup>[15][51]</sup>. These authors had a more skeptical view of heuristics, recognizing that although they are useful in some situations, these cognitive processes can lead to systematic and recurrent errors, as evidenced by the biases identified in their studies. In contrast, Simon<sup>[11]</sup> had a more optimistic view of these cognitive processes, pointing out that they make decision-making in complex scenarios more agile and efficient.

Although Daniel Kahneman and Amos Tversky made significant advances through their experiments, it is relevant to highlight that Herbert Simon was an author pioneer in recognizing and describing heuristics in the decision-making process. This recognition supports positioning Herbert Simon within behavioral finance.

## 7. Conclusion

This article discusses Herbert Simon's contributions to the theoretical foundations of behavioral finance. In addition to his critique of the concept of *homo economicus*, it explores the concepts of bounded rationality, satisficing, intuition, and heuristics. The arguments advocate that this author's ideas are similar to those of some of the principal exponents of behavioral finance. Therefore, there is support for positioning Herbert Simon within this field.

Finally, it is worth mentioning that the ideas aligned with behavioral finance extend beyond the works of Herbert Simon. Typical characteristics of this field are apparent in even earlier literature. For example, Keynes<sup>[52]</sup> stated that the state of confidence among agents affects investment decisions and stock market volatility and that these agents experience waves of optimism or pessimism. Keynes<sup>[52]</sup> referred to the psychological aspects of agents as *animal spirits*. Not surprisingly, a recent and well-known book in behavioral finance is called *Animal Spirits*<sup>[53]</sup>.

Consequently, the fact that the recognition of behavioral finance as a distinct field only emerged in the 1980s<sup>[17]</sup> does not mean that authors had not already used psychological aspects to explain the behavior of agents in financial markets long before that. Future studies could focus on identifying characteristics of this field in even older literature.

## Footnotes

<sup>1</sup> The distinction between economics and finance can seem blurred, and it is not uncommon for the second field to be considered a subdivision of the first. However, we can differentiate the fields based on the object of study. Finance focuses specifically on decisions involving financial resources. Hirshleifer<sup>[54]</sup> and Shefrin<sup>[17]</sup> further define behavioral finance as an application of psychology to understand financial decisions.

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