Behavioural economics for investors

Guide_

CNMV
COMISIÓN NACIONAL DEL MERCADO DE VALORES

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I. Introduction

Since the beginning, traditional economic theory has addressed the way in which people make their investment, saving and spending decisions. It is also based on the assumptions that people know what they want, use the available information to achieve their objectives and fully understand the risks and rewards of their financial decisions. In recent years, however, numerous discoveries from disciplines such as psychology, neurology or neurophysiology about how the human brain works have revealed that this is not the case. People often do not know what their preferences are, misuse available information and do not adequately understand the risks they take on.

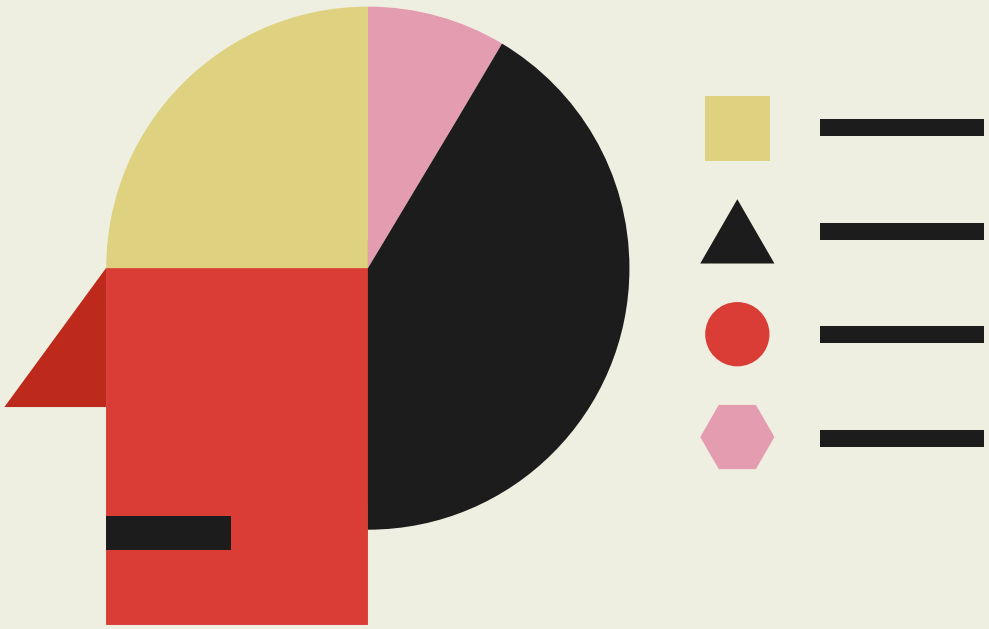
> ***Behavioural economics*** studies real human behaviours in a real world to develop more precise and practical economic models than those provided by conventional economic theory.

Behavioural economics takes into account those subtle and not-so-subtle factors that underlie financial decisions.

This discipline is an attempt to analyse the patterns and biases of people's behaviour and use these as a base to predict behaviour models.

Research conducted in the field of behavioural economics shows that most of these patterns or biases are predictable. These findings open up new possibilities for a better understanding of investor behaviour and, therefore, can help optimise financial decision making.

This aim of this Guide is to present a series of proposals to help investors apply the central premises of behavioural economics to their investment decisions. We first explain the fundamentals of behavioural economics and then provide a series of tips for applying these principles in real-life situations.



II. Concept and basic foundations of behavioural economics

Behavioural economics gained particular relevance when the 2017 Nobel Prize in Economics was awarded to economist Richard H. Thaler, following the prize granted in 2002 to Daniel Kahneman, professor of psychology at Princeton University. Both authors highlight that in essence, people are not fully rational beings and that this limited rationality affects the behaviour of the markets.

The idea that people are not fully rational beings has long been known in fields such as psychology or advertising. However, economics has only recently started factoring in sociological, anthropological and psychological aspects to explain the functioning of markets and investor behaviour.

Behavioural economics has not arisen as a counterpoint to conventional economic theory but as a discipline that complements and enriches it by contributing knowledge from the fields of psychology, neuroscience, anthropology and sociology to better understand the economic decision-making process of individuals. In the words of Richard Thaler, behavioural economics has provided economists with a greater wealth of analytical and experimental tools to understand and predict human behaviour.

The main nuances that behavioural economics brings to classical economic theory are described in the next section.

Premises of classical economic theory	Premises of behavioural economics
Subjects are fully rational.	Subjects have limited rationality.
Subjects know what they want.	Subjects frequently do not know their preferences.
Subjects have an unlimited cognitive capacity to perfectly understand the implications of each available option and adopt the one that maximises benefits.	Subjects have a limited capacity for mental calculation and aspire only to make the most satisfactory decision and not the one that maximises benefits.
Subjects make their investment, saving and spending decisions using the information available in a way aimed at achieving their objectives.	Subjects usually make their decisions considering social norms and expectations and following patterns of cooperation. Their preferences depend on the context they are in and their own mental models.
Their preferences are stable and consistent. They do not change or vary over time.	Individuals' preferences may change depending on a wide range of factors.
Individuals' preferences are not influenced by their own decision-making history or by external factors such as social conventions, their environment or the media.	Humans are social beings who make decisions within the framework of social contexts that have a decisive influence on their final decision.
Subjects are maximisers when making decisions, seeking to obtain maximum utility from their decisions. Maximisers compare all possible options to choose the best one.	Subjects are satisficers. Individuals lack unlimited information-processing capacity and choose to make the most satisfactory decision, i.e., one that is good enough, but not necessarily optimal.
The decision-making process is based on the careful analysis and calculation of all available options.	Behavioural economics believes that emotions and intuition play a fundamental role in the decision-making process.
The manner or framework in which the options and opportunities are presented should not affect an individual's decision making. The choice of the best option should not depend on how the options are framed and, therefore, should be independent of the context in which it is made.	The context in which individuals make their decisions affects the way they consider their options. If the framework changes, the choices made by the subject can change.

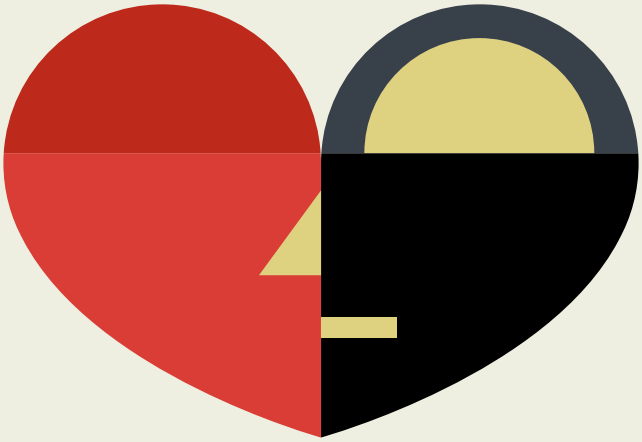
III. The process of decision making

1. General considerations

Decision making is a process by which a person must choose between two or more alternatives. It can take place in any context of everyday life, whether personal or professional. Two main factors are involved in the decision process:

- Analytical capacity, i.e., the power to evaluate and understand the context in which a decision is made and its possible repercussions.
- Emotions, i.e., the psychological state of the person adopting the decision.

Unlike conventional economic theory which contends that the decision-making process is based on the careful analysis and calculation of all available options, behavioural economics argues that emotions and intuition play a fundamental role in this process.



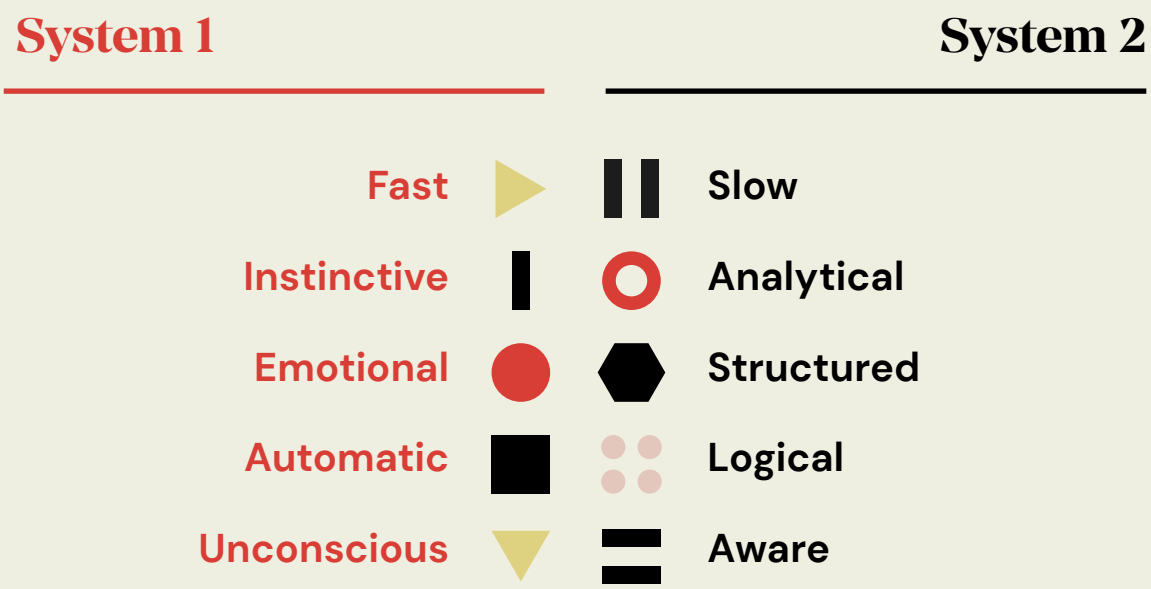
Therefore, conventional economics confers a predominant role on the rationality of the person in contrast to their emotional facet, while behavioural economics considers that the latter plays a leading role in decision making.

In this regard, Daniel Kahneman distinguishes two thought systems in his book, ***Thinking, Fast and Slow (2011)***:

- **System 1** (fast thinking) is fast and instinctive, with little or no effort and no sense of voluntary control.

- **System 2** (slow thinking) focuses on mental activities that require deliberation, including complex calculations.

The two systems interact and are always active. System 1 constantly makes suggestions to System 2 in the form of impressions, intuition, intentions and sensations. If they have the approval of System 2, impressions and intuition become beliefs and impulses become voluntary actions. Generally, both systems work smoothly together, so System 2 accepts the suggestions of System 1. Only when System 1 runs into difficulty does it turn to System 2 to suggest a more detailed and precise procedure that can solve the problem. This distribution of work between the two systems minimises effort and optimises execution. System 1 works adequately, its short-term predictions are usually appropriate and its initial responses are quick and generally fitting. However, this system has biases – systematic errors that it is likely to commit in specific circumstances. System 2, however, is a slow process that consumes a great deal of energy.

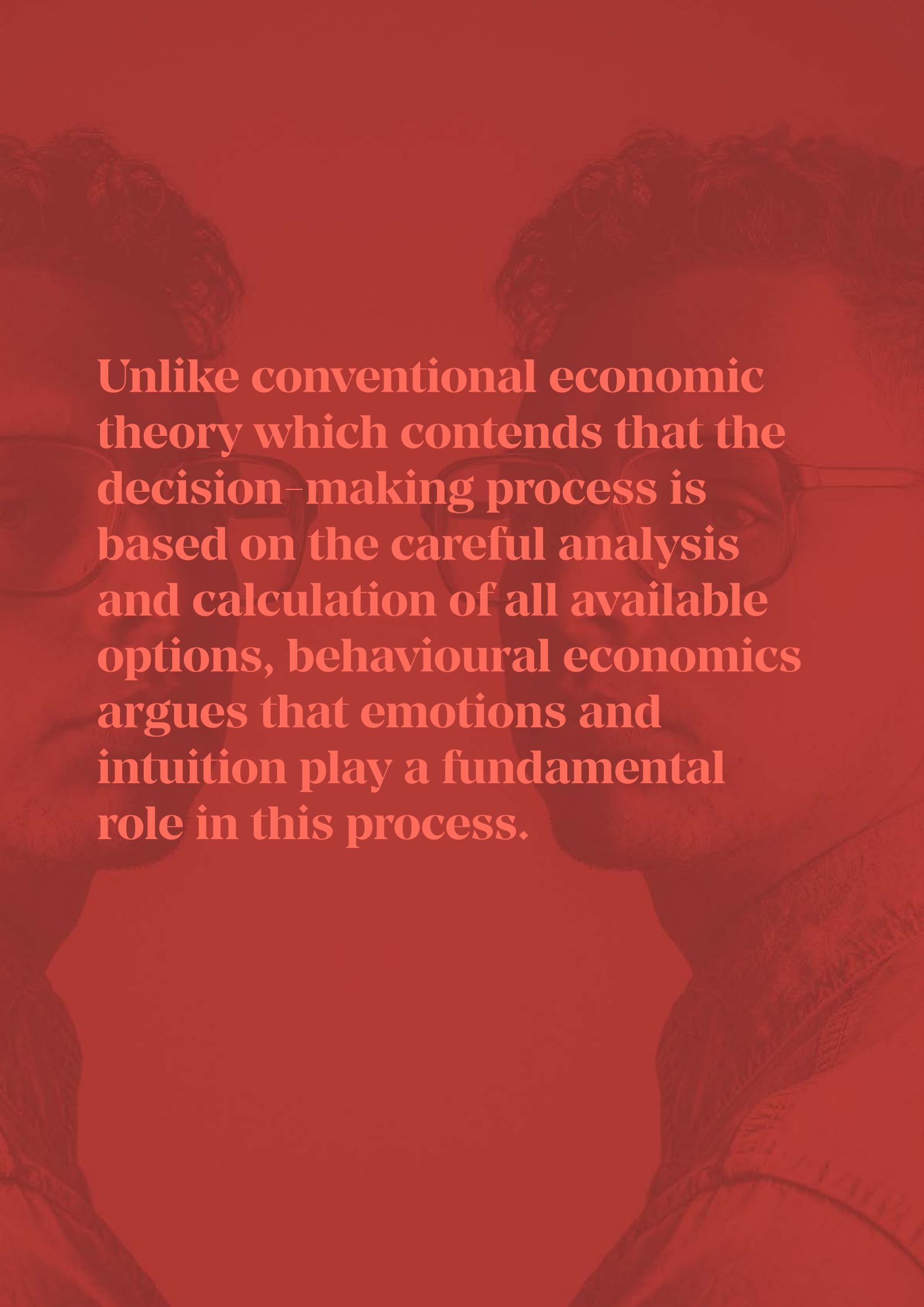


In essence, the decision-making process is shaped by one way of thinking based on emotions and intuition that produces fast and automatic responses and another more rational way of thinking that allocates attention to those mental activities that demand it.

Therefore, intuition and reasoning are the two ways of thinking. The first is responsible for quick impressions and judgements and the second is much slower, requires more effort and must be deliberately controlled.

Most daily decisions are made by System 1 with a reasonably good outcome, except for any biases or errors that may occur. System 2 acts only to solve difficult questions that require analysis and critical thinking.

Consequently, Kahneman's research shows that the rational agent model does not accurately depict humans, whose decisions are affected by "the quirks of System 1 and the laziness of System 2". Although intuition (System 1) is very efficient in making complicated decisions, the outcomes are not always correct. This difficulty is due to the existence of biases, i.e., certain tricks or mental shortcuts (also called heuristics) that help simplify the multitude of mental processes that are constantly taking place, and make daily life easier.



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2. Bias in investment decision making

People do not always make rational and careful choices. In fact, they reach most decisions following intuitive and automatic processes instead of analytical and controlled processes. This fast and intuitive way of thinking is open to the influence of biases that lead to possibly erroneous decisions. The most common biases affecting investment decisions are the following:

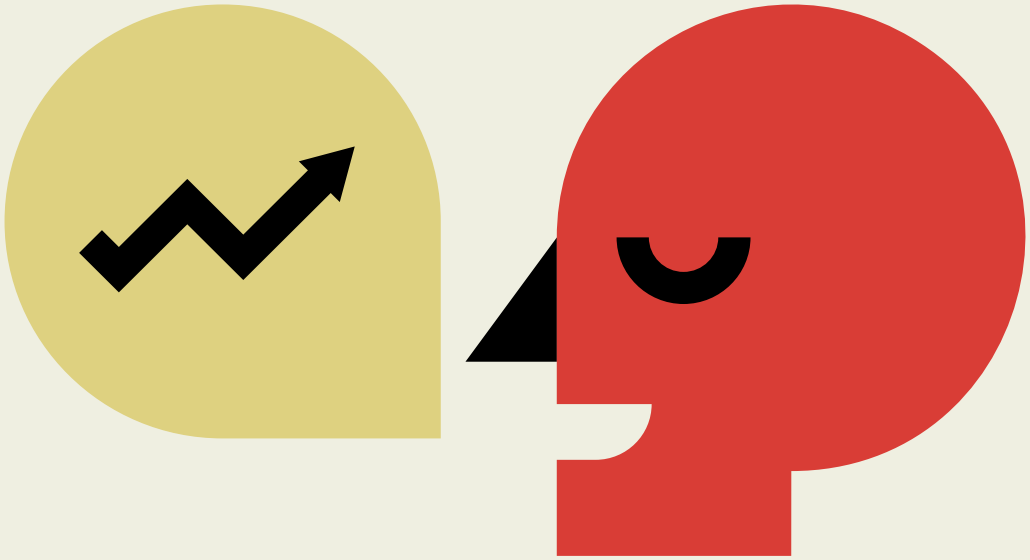
1. **Overconfidence.** The tendency to overestimate subjective knowledge and judgements and consider them to be accurate. When making decisions and forecasts, people overestimate their knowledge and personal experience without taking into account the difference between what they know and what they think they know. Overconfidence can lead investors to think the probability of their investment failing is lower than it really is. The overconfident investor underestimates the risks of their investment and overestimates the expected gains.

2. **The illusion of control.** The tendency to overestimate the existence of control or the possibility of influencing something over which objectively there is no control. This bias can lead investors to accept a higher-than-appropriate level of risk, trusting that through their analyses and available information, they can keep market fluctuations under control.

3. **Confirmation bias.** Interpreting the information received or seeking new information in a way that supports previously-held beliefs or ideas. This bias causes investors to selectively seek information confirming their opinions instead of seeking contradicting opinions or reports, with the consequent risk of making an unsuitable investment.

4. **Anchoring.** The predisposition to give more weight to information obtained in the first place than to newer, contradicting information. The name derives from the fact that these previous ideas sometimes turn into anchors that are difficult to release. Anchoring is a common bias in the investment world. For example, when the return on an investment product is presented first, investors may not take into account other less favourable information such as the associated risks. Another example is when investors take a former price as a reference for the share's performance.

5. **Authority bias.** The tendency to overestimate the opinions of certain people, without judgement, just because of who they are. Investors may make decisions based solely on a recommendation from a family member or friend, without any additional analysis and without taking into account their needs and risk profile.



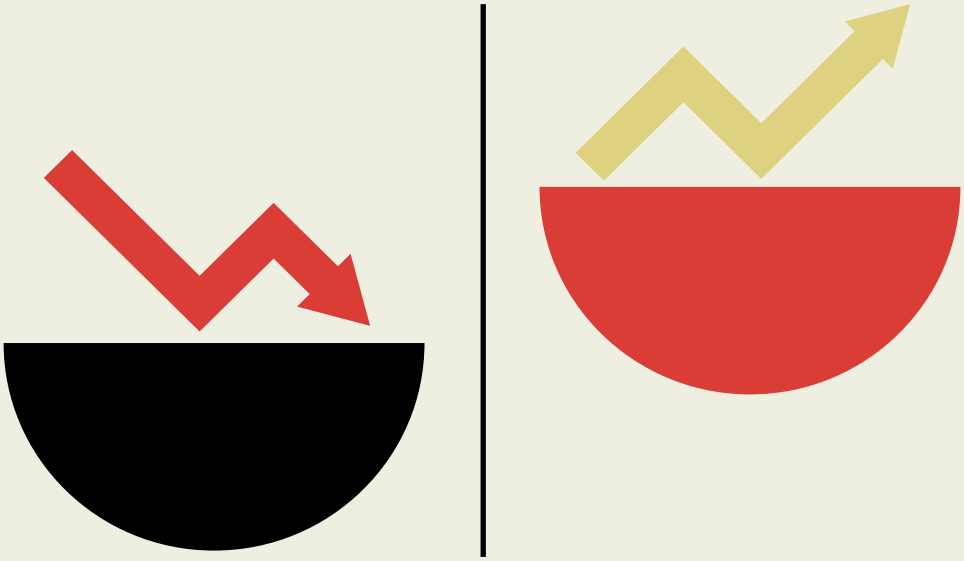
6. **The halo effect.** The predisposition to judge a person or institution based on a single positive or negative quality that overshadows all others. This bias is widespread among investors. There is a tendency to classify investment products as good or bad, using a single reference, such as a company's earnings or the popularity of the product's marketer or manager, without considering that this financial product may not be suitable for the investor's intended investment objective or risk profile.

7. **Social proof.** The tendency to imitate the actions of others in the belief that theirs is the correct behaviour. This bias occurs in situations where the subject is not sure about how to behave and is guided by the behaviour of others, assuming that they have more knowledge. In making investment decisions, investors could be persuaded by the decisions of other people and choose investments that do not suit their situation only because others do.

8. **Hyperbolic discounting.** The propensity to choose smaller and more immediate rewards versus greater rewards that are more distant in time. This bias occurs because the immediacy of rewards has an enormous power of attraction. Hyperbolic discounting can lead an investor to sell an investment planned for the long term, suitable for their profile, due to expectations of positive future market performance or the appearance of more profitable financial products, therefore altering their initial objectives and resulting in associated costs and risks.

9. **Loss aversion.** This bias refers to the tendency to weigh losses more than gains. In other words, the fear of losing something is a greater incentive than the possibility of gaining something of similar value. In order not to realise a loss, an investor might hold onto a failing investment with minimal prospects for recovery and end up losing the entire investment.

Likewise, this bias may result in temporal myopia, which is especially harmful to long-term investors, leading them to continually evaluate the value of their portfolio and overreact to news and events that occur in the short term. Myopia causes investors to lose perspective of their investments and the events that affect them.



10. **Status quo bias.** This bias implies that the current situation is taken as a reference point and any change with respect to that point is perceived as a loss.

11. **Optimism bias.** The tendency to overestimate the probability of positive outcomes and underestimating the possibilities of negative outcomes. In short, optimism weighs more than realism.

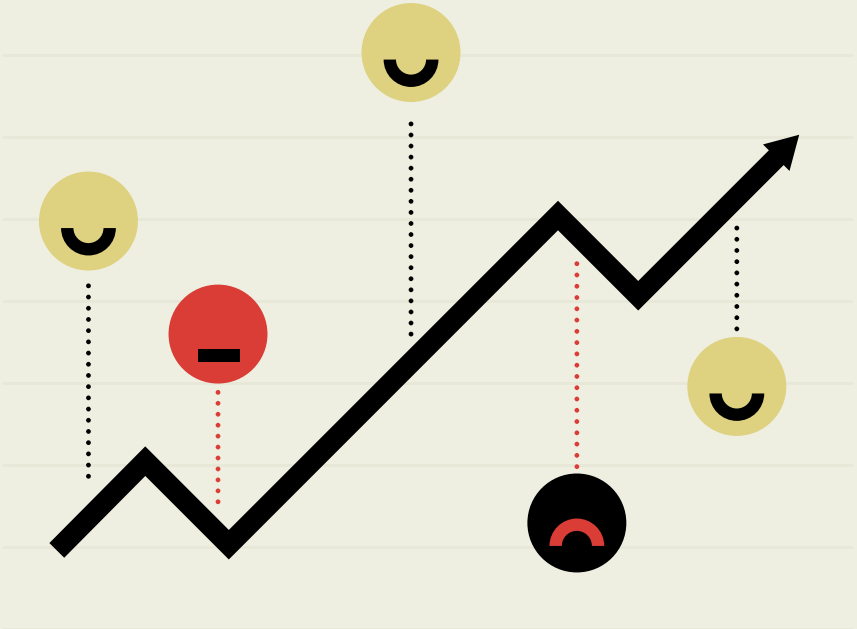
12. **The sunk cost fallacy.** This bias makes an investor hold onto an investment that has fallen or is falling, for fear of losing their initial investment.

Although the biases listed above may affect various domains, they are especially relevant to financial markets for the following reasons:

- Most consumers think financial products are complicated. Making financial decisions can be difficult and time consuming. For this reason, consumers may lack the motivation to devote time and effort to make informed decisions about their financial products. And due to the inherent complexity of these products, the little interest they arouse in most people and investors' cognitive limitations, the concepts and traits associated with financial products can be challenging to understand.

- Most financial decisions require taking on a certain degree of risk and uncertainty.

- Many financial decisions are emotional. Financial decision making can be influenced in many instances by emotions such as anxiety, fear of loss, excess optimism or a state of overexcitement.



IV. Phases of investment decision making

Investment decision making is a dynamic and complex process. It can be broken down into three phases or moments, not necessarily linear, in which the investor comes into contact with some aspect of the investment product or the firm that markets it, creating a first impression on both.

In these three moments, the investors' emotions, thoughts and language play a vital role, as these are the key elements for decision making of any kind. Also, in each phase, certain behavioural biases can influence investors, who should be aware of them to lessen their consequences. The three moments are:

1. **The search for information.** The first moment of contact with an investment product or the firm that markets it is when the investor actively seeks information about them. This moment might be an internet search, a visit to the firm, an advertisement or a recommendation or a conversation with someone; aspects such as comments on forums, social networks, customer service or advertising, among others, can influence investors.

   The most common biases in this phase are the confirmation bias, anchoring, authority bias, hyperbolic discounting, overconfidence, the halo effect and social proof. The main risk during this phase is that these biases may influence the way investors process the information they get concerning the product or firm, so they come to a decision without taking into account other data that could be relevant.

2. **Selection and purchase of the product.** In this phase, the investor deals with the selected product or firm. The investor continues to be conditioned by the biases mentioned in the previous stage, in addition to loss aversion and the illusion of control. And because human behaviour is conditioned by loss aversion and hyperbolic discounting, the way the information is presented is very important at this stage. Investors

will make decisions based on how the options are framed. They will not respond the same to the probability of making money as to losing it.

> *Numerous studies show that when given the choice between a 100% probability of making 500 euros and a 50% probability of earning 1000 euros, most subjects will choose the option of 500 euros. However, if the options are a 100% probability of losing 500 euros or a 50% probability of losing 1000 euros, subjects prefer to run the risk of losing an additional 500 euros. The expected outcome is the same in both scenarios, but the investor's inclination changes depending on whether profit or loss is at stake.*

3 **Investment tracking.** After purchasing the product, the next important phase for the investor is monitoring its performance. During this phase, the main biases that condition the investor are hyperbolic discounting, status quo bias and the sunk cost fallacy.

For example, hyperbolic discounting can lead the investor to unwind an investment planned for the long term and suitable for their profile, due to future expectations of positive market performance or the appearance of more profitable financial products, therefore altering the initial objectives and resulting in associated costs and risks. Likewise, the investor may succumb to the sunk cost fallacy and hold onto a failed investment with no possibility of recovery, to avoid the sensation of having lost the money, instead of closing the position to prevent further losses.

The following table shows a summary of the most common biases in each of these stages.

Phases of investment decision making	Bias
SEARCH FOR INFORMATION	• Confirmation bias • Anchoring • Authority bias • Hyperbolic discounting • Overconfidence bias • Halo effect • Social proof
SELECTION AND PURCHASE OF THE PRODUCT	• Confirmation bias • Authority bias • Hyperbolic discounting • Overconfidence bias • Halo effect • Social proof • Loss aversion • Illusion of control
PRODUCT MONITORING	• Hyperbolic discounting • Status quo bias • Sunk cost fallacy

V. Mitigation of cognitive biases that affect the investment decision-making process

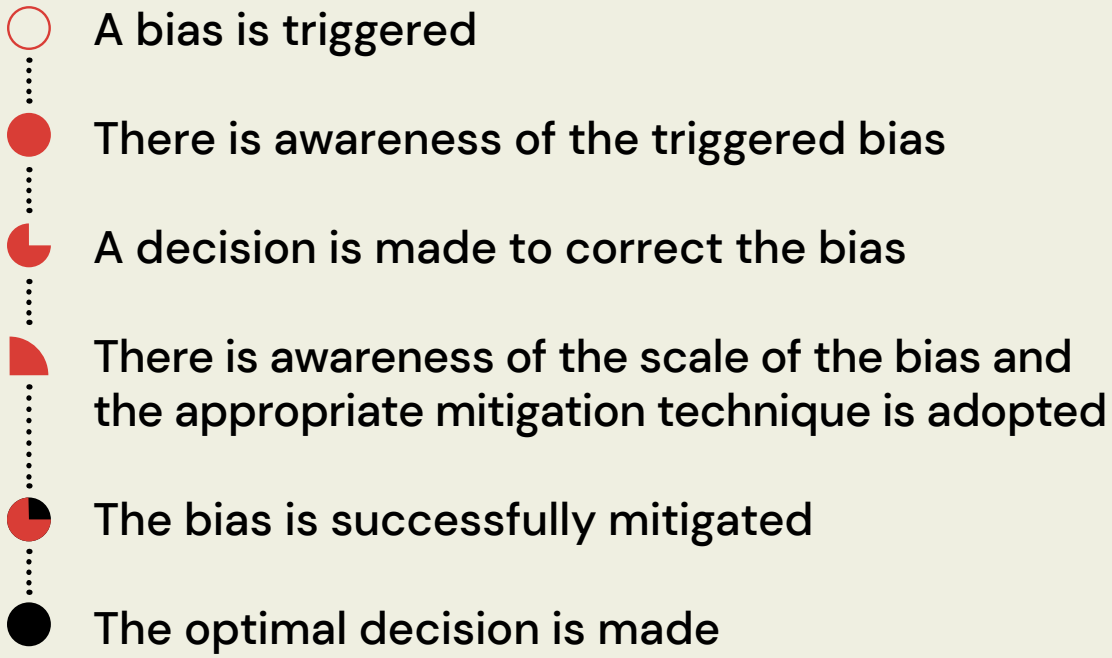
The biases that influence investment decisions and the consequent risks associated with them cannot be eliminated, but they can be significantly mitigated (debiasing).

Bias mitigation encompasses a wide variety of techniques, procedures and interventions which can be implemented on a personal and institutional level, designed to eliminate or reduce errors, distortions or other misperceptions generated in the thinking and decision-making processes.

In this sense, the brain's configuration causes systematic judgement errors. The leading causes of these errors lie in the interaction of the two previously mentioned thought systems which produce a narrow vision, framed within a specific context, and give rise to decisions based on incomplete and biased information.

> These errors cause a gap between the way we think and what would be the desirable way of thinking. Bias mitigation can go a long way to help reduce this gap.

The bias mitigation process unfolds as follows:[1]



The following section describes mitigation strategies that we can adopt to reduce the effects of cognitive bias.

1. **See** *Mental contamination and mental correction: unwanted influences on judgments and evaluations.* **Wilson TD, Brekke N.Psychol Bull. 1994;116:117–42.**

VI. Mitigation strategies for cognitive biases

Mitigation techniques are varied and, according to the intended objective, can be classified as follows:

- Techniques focused on improving decision-making skills through training.
- Cognitive techniques designed to interpret differently the factors involved in decision making.

1. Techniques focused on improving decision-making skills through training

One way to avoid biases in decision making is to provide the person concerned with the appropriate rules and guidelines. In this sense, training affects decision making. People with extensive knowledge of economics are likely to apply this knowledge when making a financial decision, thus mitigating any biases.

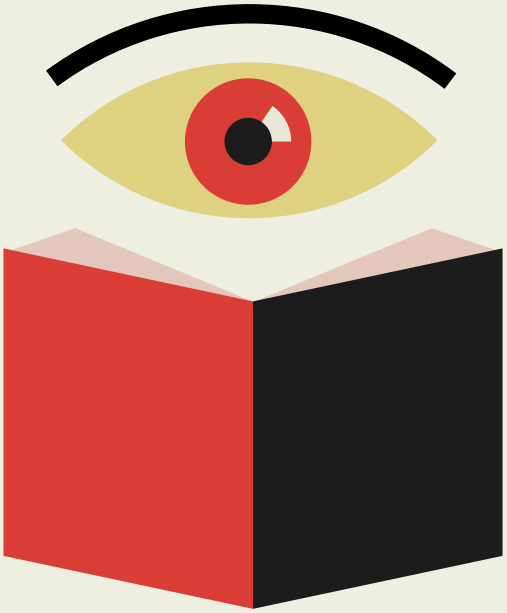
However, in addition to having this knowledge, we need to know how to identify the situations in which it should be applied and have sufficient motivation to do so. For example, proper training to make a particular decision may not be enough in the face of very strong intuition that prevents deeper reflection.

The most effective type of training focuses on building specialised skills for making quick and repeated decisions. Both these factors lead to experience and mastery in the adoption of specific decisions. The main challenge in

this area is retaining the skills learned and applying them correctly when the situation so demands, something which requires a great deal of training.

> A solid financial education, acquired from an early age and throughout one's life, is critical for financial decision making.

In this regard, as defined by the OECD, financial education should be understood as the process by which financial consumers/investors improve their understanding of financial products, concepts and risks, and through information, instruction and/or objective advice, develop skills and confidence to be more aware of financial risks and opportunities, make informed decisions, know where to go for help and take any effective action to improve their economic well-being.



Regarding financial education, knowledge of cognitive biases, which ones are most likely to crop up and when, and ways to reduce them can be most beneficial to investors. Sometimes, the mere awareness that these biases exist can help lessen them.[2] In other cases, mitigation requires deep self-knowledge that must go hand in hand with continuous observation and training. Some cognitive techniques to perform this training are described below.

Getting the appropriate training is a basic technique for mitigating biases. The training must be accompanied by continual practice, the identification of situations in which this training must be applied and the reasons for doing so. For financial matters, such training includes not only acquiring knowledge related to this domain and instruction in the skills necessary to make informed financial decisions, but also awareness of the existence of cognitive biases, the moments in which they are more likely to arise and ways to avoid them.

2. This is the case of the transparency illusion bias according to which people often believe that their internal states are more evident to others than they really are. In the field of public speaking, for example, people who get nervous when giving a speech believe that their nervousness is more evident to their audience than it really is. However, it has been shown that being aware of this bias can improve the quality of the speaker's performance, both from the perspective of the speaker and from the point of view of the observers.

   See *The illusion of transparency and the alleviation of speech anxiety*. **Kenneth Savitskya and Thomas Gilovich.** *Journal of Experimental Social Psychology*. **Volume 39, November 2003, pages 618-625.**

2. Cognitive techniques designed to interpret differently the factors involved in decision making

Cognitive techniques are the activities and mental processes that people perform consciously to understand the world around them, learn from their experience, solve problems or adopt solutions. In short, these are internally organised actions that the individual uses to process information, remember it, transform it, retain it and transfer it to new situations.[3]

Although these techniques require some effort, they create a greater awareness of the person's own thinking process, emphasising their role as protagonists in this process, encouraging them to rely on conscious reasoning rather than subconscious intuition, and helping them to identify errors in the logic used. Some of the techniques that may be most useful in making investment decisions are described below.

- **Create alternatives.**

Although the benefits of analysing problems from multiple perspectives are well established, we seldom use this technique when making decisions.

Much of the research on decision making has focused on whether people make optimal decisions when faced with a fixed set of options, but having an adequate set of alternatives from which to choose is just as important as choosing correctly.

3. **Derry, S. and Murphy, D. (1986)** *Designing systems that train learning ability: From theory to practice. Review of Educational Research.*

For financial decisions, we need to look for alternatives to the proposed investment and weigh up the pros and cons of the different options.

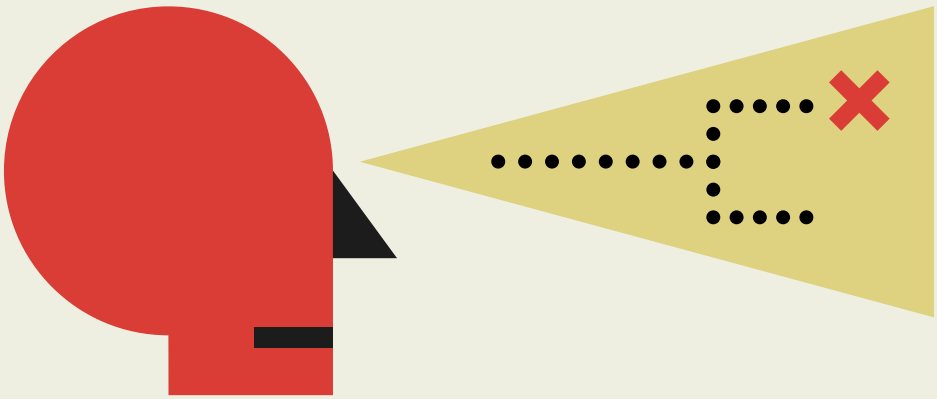
- **Curb optimism or take the opposite view. *Premortem* analysis.**

Optimism bias is a common tendency in people. This optimism comes from the way we think positively of ourselves, of the consequences of our decisions or of the future that lies ahead. It is another cognitive bias that causes us to underestimate the possibility of experiencing a negative event.

In financial decision making, the tendency towards optimism plays a significant role. An excess of optimism can alter the capacity for critical thinking when choosing an investment product, causing one to ignore unfavourable information about that product or the possibility of losing the investment.

One solution to the recurrence of this bias is simply to "take the opposite view" by articulating a series of reasons why an initial decision could be wrong or fail.

A further step is prospective hindsight or *premortem* analysis, whereby the person is mentally situated in the future and thinks that their decision has failed. Faced with past failure, even if only imaginary, people tend to identify the possible causes more easily than if they try to do this from the present moment. The reason is that human beings find it easier to explain what has happened once a thing has already happened than to make a forecast of what may happen.



Likewise, the *premortem* analysis technique can be useful in reducing another cognitive bias, called hindsight bias. Hindsight bias is the tendency, once we know what has happened, to change our memory of what we believed before the event occurred, so that it matches the outcome.[4] This false memory makes us think we could have predicted the outcome before it happened.

> Optimism is beneficial, but excessive optimism can hurt investing by generating unrealistic expectations and preventing the investor from seeing the associated risks. To avoid excessive optimism, take the opposite view of things and think about how and why the investment could fail.

- **Standardise the decision process. Investment process and checklists.**

One way to make decisions is with a standardised method by setting up a suitable procedure. By incorporating the most convenient bias mitigation techniques into this procedure, an optimal decision-making process can be developed.

Regarding financial decisions, and based on the phases of the decision-making process mentioned earlier and the biases that most frequently influence investors, it is possible to design an individualised investment process that leads to largely risk-free decisions.

4. **Bandrés Moya, Fernando; Delgado Bueno, Santiago (2010).** *Biomedicina y derecho sanitario.*

A simple way to design this process is to apply, with certain modifications, the classic five Ws of journalism: what you want to invest in, why you want to invest, how you want to invest, how much you want to invest, when you want to invest and for how long. This simple exercise necessarily encourages reflection before making a decision and, therefore, helps to reduce the influence of biases.

Another way to standardise the decision-making process, also applicable to finance, is to use checklists. This technique includes the minimum steps necessary to perform a specific task, defines the steps and avoids errors. Checklists not only offer the possibility of verification, but also instil a certain discipline to achieve the best performance while reducing errors. Although this technique originated in the field of aviation, it has spread, given its simplicity and effectiveness, to other areas such as medicine or construction.

A checklist helps us to be as rational as possible during each phase of the process and guarantees that the necessary information is available at the right time and that our decisions are methodical.

For investing, a checklist can be a list of points needing verification in the form of questions relating to the investment product under study. The answers will help clarify whether or not said product should be purchased. These lists are very personal and should take into account mistakes made in the past. They should be very brief. Likewise, they should not be static but open to improvements from experience and practice.

An example of a simple checklist would be the following:

Have I read all the product information carefully?

Is the information complete?

Do I understand the basic characteristics of the product?

Do I know what I am investing in?

Do I know the risks?

Does the product fit my investor profile?

Is the time horizon of the investment consistent with my investment profile?

Given the complexity of certain decisions, the systematisation of the process is a good option. The advantage is that it helps to reduce the errors that consistently occur in the process and which, therefore, are predictable. Like the rest of cognitive techniques, to perfect the systematisation of the decision-making process requires training and time.

- **Identify the appropriate conditions for the decision-making process.**

To avoid biased decisions, we need to mind our personal circumstances that create the context, so that we are truly prepared to make decisions.

As mentioned earlier, System 2 plays a critical role in decision making: it monitors intuitive judgement and, when necessary, corrects it. An individual will be prepared to make decisions when their System 2 is able to perform these functions.

The factors that determine whether or not a person is prepared to make a decision range from their chronotype[5] to how tired or distracted they are, or whether they are angry, hungry or sleepy. These conditions, among others, temporarily limit a person's ability to monitor decisions and notice possible errors, which means that attention is directed to a search for quick solutions and greater confidence is placed in intuition. We need to be aware that these factors limit our cognitive ability and avoid important decisions when under their influence.

Self-awareness is crucial for detecting circumstances or factors that may adversely affect the investment decision-making process. Investors should avoid these decisions if they are in an altered mood or physiological state.

5. Internal circadian rhythm of an individual that influences their sleep pattern and activity in a 24-hour period.

VII. Final recommendations

- A solid financial education acquired from a very early age and throughout life is essential. In this specific context, in addition to having the appropriate financial literacy, investors will benefit from knowing what behavioural biases are, when they occur and the techniques to avoid them.

- Before reaching a decision, think about other available options and weigh up the pros and cons of each one. Get used to searching, requesting and carefully reading well in advance all the official information that the firm must provide to help investors make informed investment decisions.

- Human beings have a strong tendency toward optimism, so before making an investment decision, think about the possibility that the investment may not achieve the desired result.

- Systematise the investment process. One way is to use checklists that include tasks or questions to ask before executing a specific transaction, thus encouraging a more analytical behaviour and mitigating any eventual biases that may occur.

- Investment decision making requires investors to be in optimal conditions. Be aware of the factors that can limit a person's ability to handle decisions, such as physical or mental fatigue.

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