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Final Thesis

The framing effect between framing the problem and
uncertainty in choices:
The case of the Covid-19 pandemic

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Abstract

Depending on how a problem is framed, we tend to make different decisions, even though the options presented are completely equivalent. This happens in economics, particularly in finance in investment choices, in psychology and many other disciplines, but especially in everyday life.

The following thesis focuses on the framing effect between problem framing and choice uncertainty, with particular reference in the last chapter to the Covid pandemic.

After an initial presentation on behavioral economics of the various standard theories present, the rational and emotional component that comes into play in choices, we see how these are related to the framing effect with some examples in psychology, medicine, marketing and advertising and how to try to overcome it.

In conclusion, we will go more specific with a real case that has 'haunted' us over the last few years and is still present, namely that of the Covid.

Introduction

There are up to now, of course, few works that examine the relationship between the pandemic and decision-making choices. My intent has been precisely to study this type of literature.

The main topic of my thesis is the framing effect. People often respond differently to different but objectively equivalent descriptions of the same problem. This bias, the studies of which have multiplied over the last decade, affects people of all ages and presents itself in everyday life and in all fields: from finance to psychology, from marketing to medicine and so on. It leads individuals to make choices based on how information is provided.

The thesis is divided into three parts. The first chapter starts with the basic concepts of behavioral economics and finance. Specifically, the first part begins with expected utility theory and its axioms, which are contrasted with prospectus theory, whose concept of loss aversion will be analyzed in more detail. Then, we continue with the various heuristics (affect, availability, anchoring and representativeness), which make us come up with solutions quickly, and the biases, the lead us to make mistake. The chapter concludes with an analysis between rationality and emotionality, and how the latter plays an important role in choices by influencing decisions.

The second chapter begins to explore the concept of framing, describing this effect with numerous studies and experiments, above all the well-known example of the "Asian Disease Problem", which fits very well with the current situation we are experiencing with the pandemic. Then, we explain the different types of framing effects with different underlying mechanisms and consequences, and how they are best used in leaning consumers towards a particular choice; the presence of these in different disciplines and how to try to overcome-limit this effect through some possible solutions, by making more rational decisions.

In the third and final chapter, we start by describing this effect in everyday life (from supermarket shopping to online shopping, from investment decisions to the covid-19), again with different examples and the various cognitive biases that have come into play due to the pandemic affecting decision-making processes, as in addition to an epidemiological pandemic, it was also a psycho-socio-cultural pandemic. We conclude by looking at a current practical example such as the covid pandemic, as the latter brings out some psychological effects such as the framing effect, how this phenomenon manifested itself in this crisis context, what influenced people's decision to vaccinate, and how decisions are made under conditions of uncertainty.

CHAPTER 1.

BEHAVIORAL ECONOMICS.

1. Behavioral finance.

Behavioral economics is defined as the combination of economics and psychology (the closest science along with sociology), which studies the influence of psychological, emotional, cultural and social factors on economic decisions (individual and group), introducing the factor of irrationality that classical economics does not consider, as it theorizes a rational world characterized by the figure of homo economicus and leaving no space for emotionality.

In a sense, behavioral economics is the inevitable result of loosening the assumption of perfect rationality. Thus, it attempts to clarify what classical economic theory cannot explain for understanding decision-making and market theories. It attempts to predict people's irrationality and consequently investigate why individuals do things that may have negative effects, consciously, using psychology and reasoning as tools.

Behavioral finance is a branch of behavioral economics and it is the study of the influence of psychology on the behavior of investors, financial analysts or managers. It focuses on the fact that investors have limits to their self-control that are influenced by their own biases and are not always rational. Moreover, influences can be the source for the explanation of all types of market anomalies and in particular market anomalies in the stock market, as serious rises or falls in stock price. Behavioral Finance, more than other branches of finance, is interdisciplinary and it borrows from the academic literature in accounting, in statistics, psychology and sociology. In particular, the psychology literature is useful in revealing how people make decisions. It is important because it helps us to avoid emotion-driven speculation leading to losses and directs us to define an appropriate wealth management strategy.

Behavioral regularities can be defined as behavioral patterns which are completely independent of population choices and that rely only on individual preferences. They can be interpreted as very helpful tools in the process of creating positive descriptive behavioral models which are based on the observation of empirical evidence, such as the Prospect Theory, as an alternative to the Expected Utility Theory, and more in general, to normative theory.

2. Expected utility theory

Expected utility theory (EUT) is a normative theory, among the most relevant and important ones that seek to understand economic behavior, used to define the rational behavior all individuals are expected to rely on when dealing with uncertainty; a model which describes the optimal behavior when making decisions. It means that normative theories attempt to explain how a rational individual should behave. So that, they are in contrast with positive theory, which instead are based on observations, used to describe the ways in which individuals behave, instead of stating how they should.

The EUT was developed by John von Neumann and Oskar Morgenstern, and it suggests that when confronted with risks, individuals should assess the relative probabilities for each possible outcome. When outcomes are not certain, the rational agent has to deal with uncertainty, that implies that agents are not comparing the utility of different outcomes, but are dealing with prospects, a series of wealth outcomes, each of which is associated with a probability. It assumes that the utility of each possible outcome is weighted according to its probability of occurrence, for example, the expected utility of winning 100 euros with a probability of 50% is equal to 50. EUT implies that individuals faced with uncertainty maximize the utility expected across possible states of the world.

The limitations of the Expected Utility Theory lie in the fact that it is a strictly normative model: this means that systematic deviations from behavior's predictions severely challenge its empirical validity.

It is important to specify that the expected utility theory has been created to deal with risk more than uncertainty: by definition, dealing with risk presumes knowing the possible outcomes to which one can assign probabilities, while when dealing with uncertainty outcomes are not fully known and hence probabilities for each outcome cannot be assigned.

Since the predictive power of a normative theory relies on a group of theoretical assumptions which could be more or less restrictive, it is really important to study the empirical validity of the model, which could be strongly challenged by systematic deviations. Indeed, this is the only way to evaluate if the model is realistic.

2.1 Axioms

Individuals have well-defined preferences over the possible outcomes, for example, “I like even numbers more than odds ones”. Preference relations ($\succ \approx \prec$) have axiomatic properties that are: order, continuity and independence.

The order assumes completeness, individuals make only meditated choices among ordered alternatives, and transitivity, that rules out cyclical preferences. For example, for all p, q and $r \in P$, we have that $p \preceq q$ or $q \succeq p$ according to completeness; while, according to transitivity, if $p \succeq q$ and $q \succeq r$ then it must be $p \succeq r$.

Continuity tells us that preference ordering has no holes. Imagine that you prefer pizza to pasta and you also prefer pasta to salad. These lotteries are given:

- A. high probability of getting pizza and a small probability of getting the salad
- B. getting pasta for sure
- C. small probability of getting pizza and a high probability of getting the salad

Given continuity, you should prefer lottery A to B, but prefer lottery B to C.

Independence suggests that if I prefer pizza to pasta, then I should also prefer pizza and a coke to pasta and a coke: adding/subtracting the same thing to two alternatives does

not change the preference ordering. The axiom of independence is based on the sure thing principle, that states that a decision maker who decided they would take a certain action in the case that event E has occurred, as well as in the case that the negation of E has occurred, should also take that same action if they know nothing about E.

Preferences complying by these axioms are defined well-behaved. Preferences are assumed to be time-invariant. Besides having well-behaved preferences, the rational individuals populating neoclassical models have:

- Perfect information and foresight;
- Unlimited computation abilities.

3. Prospect Theory

The prospect theory, included between descriptive models, is a positive theory, among the most influential frameworks in behavioral science, in particular in research on decision-making under risk. It was developed by Daniel Kahneman and Amos Tversky in the '70s which demonstrates violations of the expected utility theory and is an alternative to it.

Also Allais, through his paradox, contributed to the prospect theory since, by doing several experiments, he found that the axiom of independence was violated and therefore the EUT was unable to correctly describe human behavior.

It is based on three key aspects:

1. People sometimes are risk averse and sometimes are risk lover depending on the situation they face, or better, on the nature of the prospect;
2. People evaluate the consequences of losses or gains based on their reference point (the status quo).
3. People are loss averse, because losses are perceived differently from gains (gain or loss the same amount of money is not the same).

An example that provides a better understanding of one of the aspects of prospect theory, particularly the third, is as follows:

Example 1. Choose between:

- a. Win 0€
- b. (60€, 0.5; -60€, 0.5)

Most people choose A.

Example 2. Pick the amount X that would make you indifferent between the following.

- a. Win 0€
- b. win X with probability 0.5 or lose 25 with probability 0.5

The average response is $X = 61$.

Individuals also tend to overestimate small probabilities, such as the occurrence of rare and extraordinary events, and underestimate medium or high probabilities, categorizing events into certain, impossible and less likely.

The prospect theory is characterized by the value function, which measures the potential gains or potential losses from a neutral reference point (while Expected Utility Theory uses the utility function) and decision weights, which are functions of probabilities (that are used in EUT). It views choice options as a function of "decision weights," that is, the subjective evaluation of each individual option available. These decision weights do not always correspond to actual objective probabilities but rather to the subjective psychological value assigned to each preference by the decision maker.

3.1 Loss Aversion

Loss aversion is one of the key messages of Prospect Theory. This model argues that people are much more hostile to losses (in absolute terms) than they are pleased with a gain.

From some experiments carried out in 2006¹ regarding Capuchin monkeys, it was possible to ascertain that this phenomenon is the result of an evolutionary genesis that has not only involved humans but also other primates (although the choices made by the latter are not monetary but concern other resources, such as apple slices).

This theory implies that in facing choices regarding money decisions that have among the various options that of being able to incur a possible loss, individuals will be inclined to accept the riskier alternative if and only if this could guarantee a much higher gain than what rationally (and mathematically) should be predicted by the problem in relation to losses. Even in the case of decisions with only options that lead to profits, individuals will choose the less risky option; however, in the first case their risk aversion will have a much greater effect than in this second situation.

In another study² on capuchin monkeys in 2015 it is shown that these animals tend to choose the risky alternative over the safe one when the apple slices at stake are small (loss domain) but do the opposite when choosing between a risky alternative and some increase in apple slices. Moreover, some studies have suggested that losses are twice as powerful psychologically as gains.

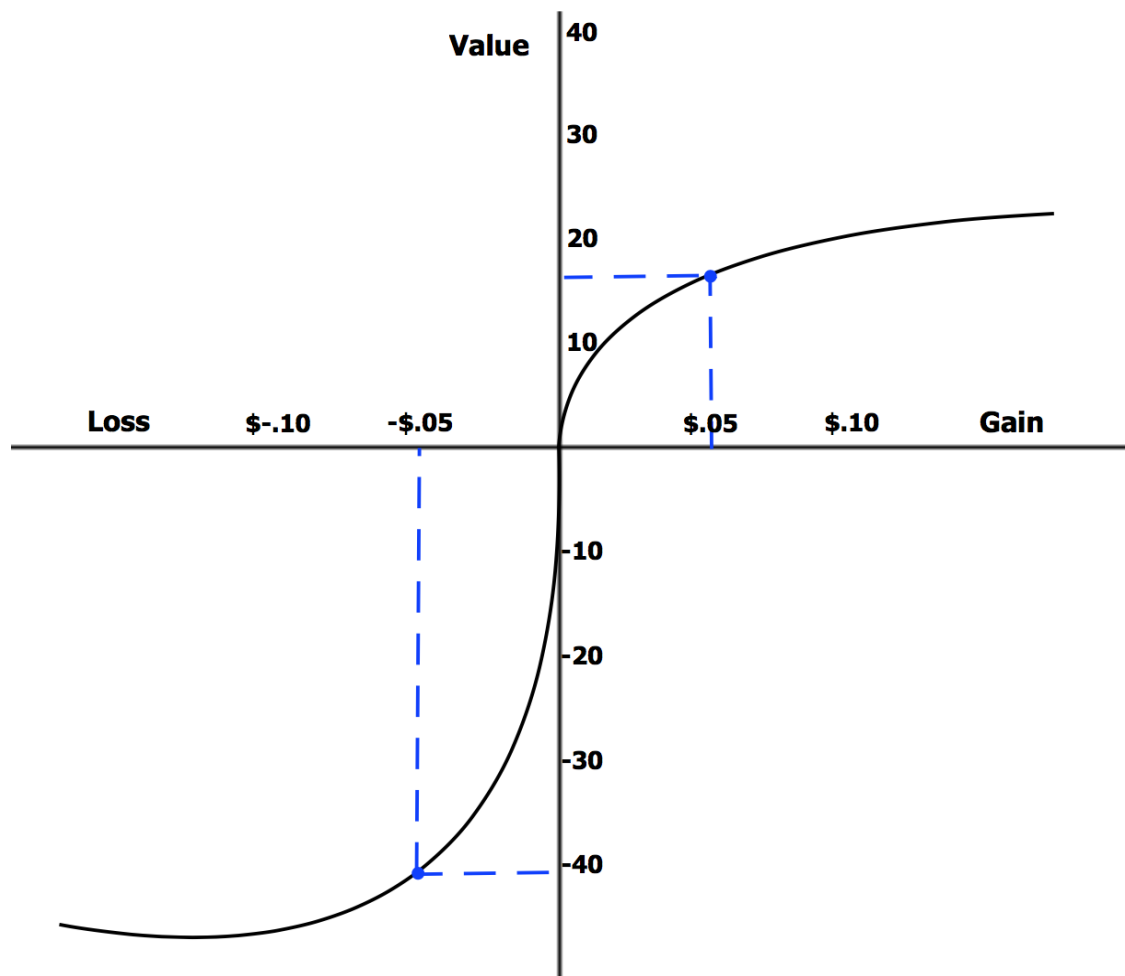
A reference to loss aversion in the real world is also made by one of the greatest tennis players of all time in his book 'Open', where he says: *"Now that I've won a slam, I know something very few people on earth are permitted to know. A win doesn't feel as good as a loss feels bad, and the good feeling doesn't last long as the bad. Not even close."*³

A model like Expected Utility Theory is violated by loss aversion and is not able to explain this human preference. However, is captured by Prospect Theory (PT), and is modelled in the following way:

¹ Chen, M. K., Lakshminarayanan, V., & Santos, L. R. (2006). *How basic are behavioral biases? Evidence from capuchin monkey trading behavior*. *Journal of political economy*, 114(3), 517-537.

² Santos, L. R., & Rosati, A. G. (2015). *The evolutionary roots of human decision making*. *Annual review of psychology*, 66, 321.

³ Agassi, A. (2011). *Open*. J'ai Lu.



We can see that in this S-shaped utility curve, the loss (convex) of value of losing money is modelled a lot steeper than the gain (concave) of utility by receiving money. While the concavity of the value of gains suggests risk aversion, the convexity of the value of losses suggests risk propensity. The PT has different utility weighting functions in the domain of gains and the domain of losses, explaining why the loss is steeper than the gain -- just as loss aversion predicts.

Implications from loss aversion mean that people will be more willing to partake in risky behaviors if there is a chance to avoid losses, and less likely to partake in risk if there is a chance for an equivalent gain.

An example of how companies might make use of Loss Aversion: insurance companies may be able to sell you insurance if they make catastrophic (even if unlikely) events salient for you, motivating you to pay a cost to insure yourself from these risks. Focusing on preventing the big catastrophes will overshadow the smaller monthly costs of the insurance.

Another example where losses hurt more than gains: when the price of a good rises, demand for it usually sinks. However, when the price for a good sinks, the demand might only rise a little bit, or even stay the same.

4. Heuristic and bias

Heuristics derive from cognitive limitations and are represented by shortcuts and solutions that use only a portion of the available information to solve everyday problems. Heuristics are automatic processes that economize on the amount of cognitive, physical and mental efforts that are needed to come up with a decision.

Many authors believe that heuristics have strong evolutionary roots: they are developed when human's brain was still developing.

There are two types of heuristics:

- Type-1 Heuristics: appropriate when a very quick decision is to be made or when the stakes are low, and therefore tend to be very automatic;
- Type-2 Heuristics: are much more effortful and are required when we are risking more than in the case of type-1 heuristics, therefore tend to be less automatic and use more information.

The idea of type-1 and type-2 heuristics is grounded on the Daniel Kahneman's Systems of Thinking: our brain is characterized by two separate systems:

- System-1 Thinking: quick, instinctive, automatic and requires little or no effort; it is affected by personal emotions, therefore tends to be unconscious and has a very evolutionary nature;

- System-2 Thinking: slower process than the previous one, requires complex and more logical decisions; therefore, tends to be more rational and conscious.

The term bias indicates a behavioral distortion that predisposes to make a mistake. It is an inclination, a prejudice, so is something that occurs before a judgment and therefore can lead to an error of assessment. More precisely, it indicates a prejudice that does not necessarily coincide with the evidence. It is developed on the basis of the interpretation of the information in possession, even if not logically connected to each other, which leads to a lack of objectivity of judgment or an error of assessment. In other words, biases represent reasoning errors that are made automatically and unconsciously when making decisions. The systematic study of the error is necessary in order to be able to analyze and observe where, how and also why a normal individual tends to make mistakes in certain contexts, or because in a given situation a subject fails to behave rationally.

As in common to the majority of investors, behavioral biases can be divided into two types. According to their nature, cognitive errors and emotional errors are distinguished.

Cognitive biases generally refer to tendencies to make a decision and to act in certain ways. A cognitive bias can be viewed as a rule, which can lead to systematic deviations from a standard of rationality or good judgment.

Emotional biases are those which result in acting based on personal feelings at the time a decision is made, instead of facts. They can also be linked to personal experiences that also influence decision making.

4.1 Affect.

Introduced in the psychological literature to explain how emotions can influence people's reactions, the tendency of people to be guided by emotions (affect) in their decision making. The affect heuristic leads individuals to disregard the arguments and information they possess, but to base their choice solely on their intuitive judgement

and affection felt for the subject matter in question, causing people to place a higher value on the goods they possess than on those they do not. In other words, an individual who has incurred a certain economic sacrifice to purchase a certain item will be willing to give it up only for a higher consideration than the price at which he or she purchased that item. Therefore, should he then want to sell it, a feeling of loss would arise, breaking away from the status quo.

With regard to the Covid pandemic, the various restrictions were seen as a loss that broke the status quo represented by freedom of movement.

One of the most famous cases of this heuristic comes from Kahneman's studies⁴, where a group of students are given a mug and can choose whether to sell it or exchange it for another object (such as a pen). The results show that most participants prefer to sell the mug, after it becomes their property, rather than exchange it for another product. Moreover, the selling price is on average higher than the original price.

According to this theory, individuals attach emotions to their mental representation of objects and events. Then, in their decision-making process, they consult this “affect pool” that contains all these affective tags to make their judgement. It is considered a heuristic because it makes individuals able to make decisions without the need of weighting the pro and cons of each decision. Indeed, the using of these affective impressions helps people to make faster decisions in a more efficient way.

4.2 Availability.

The availability heuristic was identified by Kahneman and Tversky along with representativeness and anchoring. These three heuristics of judgments highlight the fact that individuals assess the probability of an event according to their understanding of the situation when, instead, this assessment should be done considering logical and

⁴ Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1990). *Experimental tests of the endowment effect and the Coase theorem*. *Journal of political Economy*, 98(6), 1325-1348.

probabilistic reasoning. Therefore, these heuristics lead individuals to make probability judgment mistakes.

The availability heuristic can be defined as people's tendency to assess the frequency of a class or the probability of an event by the ease with which instances and occurrences come to mind. People tend to use examples and information that most easily come to mind, and they ignore others. This tendency is called availability bias. As representativeness, availability focuses on sample data but, now what really matters is the easiness of recalling the data: the easier is for people to recall something, the more available that information is, and the more strongly people believe that information is meaningful in representing the overall population.

For instance, when people are asked if it is more likely that a randomly selected English word starts with a letter k or that k is the third letter, they tend to recall words that begin with k because it is much easier to search for words by their first letter than by their third letter.

In his book "Thinking, fast and slow"⁵ Kahneman described a work based on egocentric judgments, ran on married couples through the collection of surveys, in order to explain the meaning of availability bias. The couples were asked about their contribution, in percentages, to the housework activity, as for instance keeping the place tidy and taking out the garbage. The self-assessed contributions were summed, and it resulted to be more than 100%. This is due to the availability bias, in fact, people tend to remember more clearly their own efforts rather than those of the partner.

Moreover, availability is affected by two factors: salience and recency. People's memory retrieves more easily to mind salient events, which are those important and noticeable events that attracted people's attention (as, for example, seeing a car accident has a greater impact than reading about one); this is called saliency bias. In addition to this, people's memory retrieves more easily to mind events that happened recently. Recent

⁵ Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.

occurrences tend to have a greater impact than older occurrences. This tendency is called recency bias.

4.3 Representativeness.

Representativeness heuristic was first described by psychologists Amos Tversky and Daniel Kahneman during the 1970s and it's described as the tendency to evaluate the probability of an outcome A based on the degree to which A resembles B. So, representativeness heuristic is a bias that occurs when the similarity of objects or events confuses people's thinking regarding the probability of an outcome, that because people frequently make the mistake of believing that two similar things or events are more closely correlated than they actually are. In particular, individuals tend to consider a small sample as closely representative of the underlying population, the so called "law of small numbers". Consequently, when estimating the likelihood of a future event, people are inclined to incorporate the information provided by recent past events and how these events relate with the distribution they have in mind.

An example of this bias in financial markets is when investors automatically assume that good companies make good investments. However, that is not necessarily the case because a company may be excellent at their own business, but a poor judge of other businesses. Another example could be the analysts forecasting future results based on historical performance: just because a company has seen high growth for the past years doesn't necessarily mean that trend will continue indefinitely into the future.

In conclusion, for an investor, a good strategy to protect against representativeness heuristic could be keeping an investment diary, where you can write down your reasoning and then match it to the outcomes, whether good or bad.

4.4 Anchoring.

Anchoring is the tendency to overweight a certain initial benchmark (anchor) in a decision making or judging process. In particular, in the presence of anchoring an

individual relies on previous beliefs or information received to take his decision, sometimes even if the information is irrelevant for the decision he/she's facing. The result is that the use of this anchor as an initial value to make estimates actually biases the final result. In fact, the adjustment that the individual makes to adhere to his previous beliefs/information is insufficient to get him to the actual final result.

Anchoring was first detected and theorized by Kahneman and Tversky with a peculiar experiment. A group of people was asked to give (within 5 seconds) the result of the following product:

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$$

In this case, the median answer given was 512, which is quite underestimated with respect to the actual result (40.320). The two scholars later investigated what happened if the sequence was transposed and asked the participants to quickly give the result of:

$$8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

In this other case, the median answer given was 2.250, which is quite different from 512, but still far from the actual result.

Kahneman and Tversky tried to theorize these dynamics through the concept of anchoring. In both cases the participants had to estimate the result of the multiplication because of lack of time. To do so, they anchored their estimation to the first calculations and the first numbers multiplied. For this reason, when the first are small numbers, the estimation is quite undervalued (case of 512 estimate). On the contrary, when the first are larger numbers, the estimation tends to higher values (case of 2.250 estimate).

However, two important things must be pointed out: first, is that this result was seen in the context of "fast" thinking, when time given to answer was pretty short; secondly, empirical evidence from experiments show that despite anchoring to two different values (smaller and larger), in both cases the estimate results in a value far from the correct one.

Anchoring is therefore a relevant bias that can significantly influence people's decisions and even lead to overlooking of sample data. This bias can be possibly explained by two aspects, referring to relevant and irrelevant anchors.

For relevant anchors, uncertainty about the true value is a valid explanation. In this context, based on the level of uncertainty toward the actual value required the individual estimation is closer to his/her reference point the more uncertainty he/she feels.

For irrelevant anchors, instead, cognitive effort/laziness is a valid explanation. This point of view is based on the fact that people often consider the anchor as a hint and moreover feel that moving from the anchor is too effortful.

5. Rationality vs emotionality

Rationality is the quality of being based on clear thought and reason, or of making decisions based on clear thought and reason. This word can be used in different fields, and for each it would have a special meaning, rationality is commonly discussed in fields of study such as sociology, psychology and economics to name a few. In order to understand rationality and decide whether it applies to a certain choice or decision, many assumptions have to be made.

Rational behaviour expects the individual to be totally able, among all the alternatives, to make the best choice, the one that maximizes his/her utility. This is the central concept of neoclassical economics, which relies on three important assumptions about people, that is: people have clear preferences among the possible outcomes and states of nature; they are able to maximize their wealth/utility; people can also make independent decisions since they have all the useful information.

This behaviour can be expressed by the homo economicus, a perfect rational agent, whose preferences are always well-defined, complete (this means that they can be classified) and transitive. For example, if a person prefers going to the cinema rather than the swimming pool, and he/she also prefers going to the swimming pool instead of

the park, automatically going to the cinema will be preferred rather than going to the park. Also, a rational behaviour implies time invariant preferences. But all of this does not reflect the truth, since there are persistent behavioural biases caused by uncertainty, which is always present, not only on everyday choices, but even in financial markets.

Another famous example to better understand rationality is to ask the question “if we see a man in the park burning money, is he being rational?”, if we look at it from a psychological point of view probably the answer is not, but in the economic field it can be totally reasonable. Maybe that man likes fire or maybe he hates money, it doesn’t matter how little sense a decision makes as long as it is backed by a preference and creates a pattern with all the other decisions. There is an axiomatic concept according to which there has to be consistency with each choice and decisions you make.

Therefore, rational behaviour can never really be adopted, since there are many factors that influence people, which make them not as fully rational as emotions.

Emotions are anger, hatred, guilt, shame, pride, happiness, admiration, regret, envy, fear, hope and so on and so forth. They can be divided into social emotions, emotions generated by thoughts about what might have happened but did not, emotions generated by the thought of what may happen, emotions generated by bad and good things and emotions generated by the possessions of others.

According to Jon Elster⁶, there exist six features that allow defining emotions:

1. Cognitive antecedents: beliefs are important in the generation of emotions. For arising an emotion, we must have a belief (i.e. living) because they arrive in contrast with a belief that you hold a specific situation. In this sense, emotions are dependent on a precise interaction, on a precise action.

⁶ Elster, J. (1998). *Emotions and Economic Theory*. Journal of Economic Literature, 36(1), 47–74.

2. Intentional objects: emotions are about something (such as individual, objects or situation).

3. Physiological arousal: emotional responses are accompanied by hormonal and nervous changes. Emotions are often accompanied by a physiological response because when you feel emotions, all your body is feeling it.

4. Physiological expressions: hormonal and nervous changes manifest in observable states (may or may not be functional). An example is thinking when somebody is angry or happy, it is essential just looking at their faces or holding their hands and you could understand their feelings.

5. Valence: emotions can all be rated on a scale that has a neutral point at the centre and positive, negative emotions at the endpoints. It is important to accept both negative and positive emotions. It could be very obvious to us but in psychology at the beginning, the focus was on addressed the reason and pattern behind negative emotions. Moreover, it is noted that positive psychology can benefit more than studying only negative emotions.

6. Action tendencies: emotions often trigger an action-reaction, may be regulated or not. If we consider an example, we feel happy about good news, we would like to demonstrate our emotions by hugging someone or screaming in the case whereby we feel angry. This implies that emotions generate tendencies, but this does not indicate that they turn into action because we could regulate the impulse to translate emotions into actions, movements, especially depending on different people and situations.

Emotions are different from moods that are unspecified, although have positive or negative valence, longer duration, often unobservable, general and not-action oriented. While affect is how a person experiences a feeling.

CHAPTER 2

THE FRAMING EFFECT

1. Framing.

The framing effect is a phenomenon studied in psychology that often invalidates the assumption that people are rational in their preferences and decision making. It occurs when equivalent descriptions of a decision problem lead to systematically different decisions. This effect guides us to so-called biases, cognitive biases that lead us to make errors in decision making. They lead individuals to make choices based on how the information is given. In other words, given the framework of how information is shown, a person's perception and memory can be influenced. These are generally involuntary psychological phenomena that we all have that distort our vision leading us to wrong conclusions and decisions.

By framing we mean a context in which decision makers have a specific idea, a specific view on an issue, on a problem. Consequently, the concept of framing tells us that, the decision maker takes a specific position on a specific issue, and the moment he or she changes his or her mind on that issue, we are faced with a violation of the Expected Utility Theory. This is due to the fact that human beings are expected to meet some basic prerequisites of consistency, and the moment they take a different perception on an issue, this leads them to violate the normative theory (EUT). It must be said that this ability to maintain such consistency is expected to be achieved only by homo economicus. In most cases, we will be faced with changes in the individual's point of view due to frame changes.

An early study⁷ done in the early 1980s highlighted the fact that the way in which the same piece of information is declined can influence our choices. In particular, they proposed an example known as the "Asian Disease Problem" that fits very well with the

⁷ Tversky, A., & Kahneman, D. (1981). *The framing of decisions and the psychology of choice*. Science, 211(4481), 453-458.

current situation we are experiencing in that between information and misinformation the Covid brings out certain psychological effects, including the framing effect.

The experiment assigns two different groups of people (randomly) to one of two versions of the following problem: *"Imagine that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs have been proposed to combat the disease. Assume that the exact scientific estimates of the consequences of the programs are as follows."*⁸

The first group must decide between:

1. Program A, which can save 200 people with certainty;
2. Program B, which has a 1/3 chance that all 600 people will be saved and a 2/3 chance that no one will be saved.

Program A is chosen by 72% of voters while Program B by the remaining 28%. The most voted choice in this case is risk-averse: the certain chance of saving 200 lives is more attractive than the same expected value with the 1/3 chance of saving all lives.

The second group, on the other hand, is asked to choose between:

1. Program A, where 400 people will certainly die
2. Program B, where there is a 1/3 chance that no one will die and a 2/3 chance that everyone will die.

In this case, program A is chosen by 22% of voters while program B is chosen by 78%. Risk propensity is chosen because the 1/3 chance that no one will die is more attractive than the chance that 400 people will surely die.

⁸ Tversky, A., & Kahneman, D. (1981). *The framing of decisions and the psychology of choice*. Science, 211(4481), 453-458.

This result violates the invariance principle: people should answer the same way (if they were rational) since there is no substantial difference between the two versions but only in the way they are formulated.

FRAMING 1	PROGRAM A	PROGRAM B
SAVED LIVES	200	$1/3 \times 600 + 2/3 \times 0 = 200$

FRAMING 2	PROGRAM A	PROGRAM B
LOST LIVES	400	$1/3 \times 0 + 2/3 \times 400 = 400$

As we can see from these two tables above, the two situations are exactly equivalent: by calculating the probabilities we get the same expected value. It is evident that the first group of candidates was subjected to a message in which positive elements (lives saved) prevailed, while the second group was exposed to negative content (lives lost). It can be seen that in the first case the candidates leaned toward a certain type of response, while in the second case the concentration of responses occurred around the probabilistic type of solution.

Some associate the results of this experiment not only with the frame effect but also with so-called pathosensitivity, that is the inability to process sufficient detachment from the pain that a subject has around him or her and is directly affected by it.

It should be noted that similar tests produced the same results regardless of whether the sample was doctors, students or patients which leads to the inference that this perception error is not related to profession or education, but rather to the level of knowledge and experience one has with these phenomena.

An article published on the website of the National Center for Biotechnology Information, which is a part of the US National Library of Medicine, deals with this issue.

In the article⁹, the lack of education in the understanding of uncertainties is referred to as 'innumeracy'. The example that is given is that a few years ago, women in England were told that the use of contraceptive pills doubled the risk of thromboembolism and because of this many stopped taking them, resulting in an increase in unwanted pregnancies and miscarriages. The reality was, however, that the risk increased from 1 to 2 per 14,000 women.

The example of the 'Asian disease problem' is linked to the concept of loss aversion in behavioral finance where people prefer to avoid losses rather than acquire equivalent gains and thus are more likely to take risks in the loss domain than in the gain domain.

Another survey¹⁰ was also done to better understand the framing effect. They proposed to a group of subjects the same question but posed in different terms:

1) "You have to undergo an operation that has a 10% chance of proving fatal to you. Would you agree to do it?"

2) "You have to undergo an operation that in 90% of cases will be of no consequence. Would you agree to do it?"

The result was overwhelming. In fact, most people who were asked the first question answered that they would refuse the operation. In contrast, the majority of people who were asked the second question answered that they would accept. Obviously, the operation in question is absolutely the same and both sentences mean the exact same thing, namely that the operation has a 10% chance of failure and a 90% chance of success. Our brain assesses the meaning of the received information depending on how the sentence is posed. In the first case, in fact, our attention is conveyed to the phrase "the 10% probability that it will prove fatal to you" to which our brain will give more emphasis, even though the phrase implies that most of the odds are in favor of the

⁹ Gigerenzer, G. (2003). *Why does framing influence judgment?*. Journal of General Internal Medicine, 18(11), 960.

¹⁰ Tversky, A., & Kahneman, D. (1981). *The framing of decisions and the psychology of choice*. Science, 211(4481), 453-458.

success of the operation. However, this evidence about failure blinds our decision-making judgment and almost obscures the fact that we have a 90% chance of success.

Clearly, this technique is most evident when confronted with questions that need to be answered impulsively or otherwise with little time, because if this were really referring to a surgical operation, there would be enough time to think about it to rationally overcome this cognitive bias.

Gerd Gigerenzer, a famous German psychologist, also describes this phenomenon in one of his most famous works¹¹, going on to say that choices are made through an 'ecological rationality' according to which a heuristic is rational if it fits the structure of the environment in which it is applied. Ecological rationality states that the rationality of a given decision also depends on the circumstances in which it takes place. What is considered rational in terms of traditional choice, therefore, may not be considered so in terms of 'ecological rationality' and vice versa. In other words, people who make use of the strategies of ecological rationality, without the need for great preparation but simply making use of their own experience, are able to make good decisions from the mental mechanisms whose internal structure they can exploit and the configurations assumed by the information available in the environment. He goes on to say that every human being has a 'toolbox' in which heuristics received as a gift genetically and experienced in his environment can be found. Whenever he finds himself in the condition of making a choice under conditions of uncertainty, they will automatically come to his rescue without his cognitive system having to make any effort.

One example, described as a 'psycho-trap', was conducted by Sher and McKenzie¹². Two glasses of water, one full and one empty, were placed in front of a subject. He or she was asked to pour half of the contents of the full glass into the empty one and then pass

¹¹ Gigerenzer, G., & Selten, R. (Eds.). (2002). *Bounded rationality: The adaptive toolbox*. MIT press.

¹² Sher, S.; McKenzie, C. R. M. (2006). "*Information leakage from logically equivalent frames*". Volume 101, Issue 3, October 2006, Pages 467-494.

the 'half-empty glass' through. The two psychologists constructed exactly this same situation with a hundred or so students, assigning each glass a number hidden at the bottom, so that all even-numbered glasses were initially full; all odd-numbered glasses were initially empty. It was noticed that most of the subjects placed the initially full glass as the half-empty glass. Evidently, they had been influenced by the fact that it had 'become half empty'.

These and similar experiments show that many of our decisions are profoundly distorted by the way information is presented to us. When presented with a positive picture we tend to avoid risk, whereas when faced with a negative picture we are more likely to accept risk.

2. Different types of framing.

There are mainly three kind of framing effects, that are: the primacy effect, the recency effect, and the halo effect.

The first one, the primacy effect, refers to the tendency to recall information presented at the beginning (when the attention is higher) of a list better than information at the middle or end. It is classified as a cognitive bias, since the meaning is deviated by the way the frame is structured. We can consider then that frame not only reefer to the domain of gain or losses we can also include time, in this case not sequential, so what came first have a stronger impact. We also experience it for ourselves, when reading a list of adjectives, we tend to pay more attention to the first ones and remember them better, so if the first ones are positive, we will have a better impact than when the same list starts with negative adjectives, even if they are just reversed.

We normally use the expression "first impression matter" because that is related to the tendency of our brain to storage better the first things we see. The primacy effect is connected to the recency effect, the fact that we recall the latest information better.

The second one, the recency effect, is the tendency - when evaluating events or items that are sequential and temporally spaced by a nontrivial passage of time - to remember

last information better than previous one, thus conferring it greater impact. This effect is a type of cognitive limitation that affects perception and memory by framing them. Cognitive limitations, such as the recency effect, shapes the individual's choice space to simplify information and avoid the overloads in which individuals with limited processing capabilities would otherwise incur.

Recency effect could influence investor's behavior by making them perceive those recent events are more important than past ones, thus putting too much weight on what recently happened when making investing decisions. Also, if it is true that recent trends tend to continue (see momentum investing) decisions should not be heavily influenced by recency.

These first two effects were studied by Haugtvedt and Wegener (1994)¹³, who investigated the effects of presentation order on consumer attitude. When the recipients of the message attached high personal importance to the materials, this was referred to as the primacy effect, while when they attached low personal importance, this was referred to as the recency effect.

The third one, the halo effect, relies on the fact that the external presentation and the physical features of an individual matter and can influence the way other people perceive them. It is a cognitive bias which consists in generalizing a single characteristic or quality of an individual or an object, that make us judge people or objects on the base of few characteristics, while ignoring the others. It can be observed in everyday life in many areas. We apply it every time that we see a person for the first time without even realizing it most of the time. For example, when people discuss a master thesis or make a job interview, they want to look their best because they know that dressing up nicely make a better impression even if the quality are exactly the same. Similarly, we can see the Halo effect in marketing, when people have a good experience with a product, they create a positive effect for the company that makes it, whereby the positive features of

¹³ Haugtvedt, C. P., & Wegener, D. T. (1994). *Message order effects in persuasion: An attitude strength perspective*. *Journal of consumer research*, 21(1), 205-218.

a particular objects will be extended to the other objects of the same brand. Even if we say that we should not judge a person at first glance, but know him more thoroughly, often the first impression is what matter.

In addition to these three, there are three other framing effects to consider, all of which involve valence framing and they are: risky choice framing, attribute framing and goal framing.

Risk choice framing differs from attribute framing and goal framing since it involves a choice between two objects and is the one most closely related to the concept of standard 'framing'. It frames a set of options with different risk levels. The emblem of this type of effect is the 'Asian disease problem' that we analyzed in detail in the previous section, in which we see that the choice between a risky and a risk-free option with the same expected value depended on the negative or positive frame with which the different options were presented. In general, the effect of framing on risky choice denotes that people are inclined to take risks in a negative context, to avoid losses.

Attribute framing identifies the manipulation of a single attribute that influences the evaluation and choice process but not the riskiness. A well-known example demonstrating how product characteristics influence consumer choice is that provided by Levin and Gaeth¹⁴ (1998), in which it was shown that a steak was considered better (tastier and less fatty) if it was labelled in positive terms as '75% lean' rather than in negative terms as '25% fat'. Also in a study by Braun et al (1997)¹⁵ a chocolate bar labelled as '80 per cent fat-free' (positive frame) was considered better than '20 per cent fat' (negative frame). Therefore, positive labelling in a product description leads to the effects of attribute framing and associates favorable events to our memory.

¹⁴ Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). *All frames are not created equal: A typology and critical analysis of framing effects*. *Organizational behavior and human decision processes*, 76(2), 149-188.

¹⁵ Braun, K. A., Gaeth, G. J., & Levin, I. P. (1997). *Framing effects with differential impact: The role of attribute salience*. *ACR North American Advances*.

In the goal frame what is manipulated is the presentation format of the consequences associated with performing or not performing a certain behavior, affects the persuasiveness of a communication. A positive frame describes the advantages associated with performing a given behavior, while a negative frame describes the disadvantages associated with not performing a given behavior. It has often been used to promote behavior in the health sector.

In 1999 Detweiler¹⁶ showed that the prevention effects of sunscreen were more effective in the positive frame, where it was said that using sunscreen increases the likelihood of maintaining healthy skin and decreases the likelihood of skin damage, than in the negative frame in which it was said that not using sunscreen increases the likelihood of skin damage and decreases the likelihood of maintaining healthy skin. Mayerowitz and Chaiken (1987)¹⁷, on the other hand, showed that the disease-preventive effects of not self-palping the breast were more effective in the negative frame. This was after distributing two leaflets with a positive message (benefits from palpation) and a negative message (disadvantages related to non-palpation) to two groups of women.

To explain these different results, Rothman and Salovey (1997)¹⁸ came up with two types of behaviors: prevention behaviors and detection or diagnosis behaviors. The former would be geared toward maintaining health status without incurring risk (example sunscreen), in which the positive frame prevails over the negative frame; the latter are still related to maintaining health but with a certain level of risk (example breast self-palpation), in which the negative frame prevails over the positive frame.

¹⁶ Detweiler, J. B., Bedell, B. T., Salovey, P., Pronin, E., & Rothman, A. J. (1999). *Message framing and sunscreen use: gain-framed messages motivate beachgoers*. *Health psychology*, 18(2), 189.

¹⁷ Meyerowitz, B. E., & Chaiken, S. (1987). *The effect of message framing on breast self-examination attitudes, intentions, and behavior*. *Journal of personality and social psychology*, 52(3), 500.

¹⁸ Rothman, A. J., & Salovey, P. (1997). *Shaping perceptions to motivate healthy behavior: the role of message framing*. *Psychological bulletin*, 121(1), 3.

In addition, some studies on goal framing include 'social dilemmas', situations in which individual and group interests are in conflict and, if each individual attempts to maximize their own gain at the expense of the group, they will suffer a greater loss than if they had contributed as a group. Brewer and Kramer found that subjects were more willing to maintain a common resource (thus giving up a personal benefit) than to suffer a personal loss.

3. Framing in different disciplines.

The framing effect, in addition to everyday real life, plays an important role in several disciplines, including marketing and advertising, psychology and medicine. It is an effective technique to be used in the presentation of prices and testimonials. In marketing and advertising, we often encounter situations where a message can be phrased in positive or negative terms. For example: satisfaction rate of 85 percent versus dissatisfaction rate of 15 percent; medication is effective in 95 percent of samples versus ineffective in 5 percent of samples. In the field of advertising in particular, the way in which a message is spread is very important, as nowadays consumers come across numerous advertisements from different sources.

Although positive framing appears more common than negative one, the way a message is framed can be used in much the same way that other device variables are used in advertising. Smith (1996)¹⁹ found that educated consumers are more influenced by negatively framed advertising, and positively framed advertising has a more favorable impact than negatively framed advertising on purchase decision judgments for processing products.

Again, regarding framing in advertising, in a study by Cheng & Wu (2010)²⁰, participants were asked about their willingness to buy a translator based on a particular description

¹⁹ Smith, G. E. (1996). *Framing in advertising and the moderating impact of consumer education*. *Journal of advertising research*, 36(5), 49-49.

²⁰ Cheng, F. F., & Wu, C. S. (2010). *Debiasing the framing effect: The effect of warning and involvement*. *Decision Support Systems*, 49(3), 328-334.

paragraph. One description was made in positive terms, in which certain properties of the product are presented as advantageous; the other in a negative context, in which the properties are presented as losses. According to this experiment, consumers appreciated the translator more when it was described in a positive frame (as a gain).

In marketing, attribute framing is very present, as it mainly refers to the characteristics of a product that influence a consumer's choices. A well-known experiment is that of Levin²¹ (which we have seen above) which demonstrates the potential of this effect. The result is that the way in which specific attributes of a product are described conditions consumers' perception of it. Even though objectively it was a product (meat) with the same characteristics, it was presented differently to two groups of participants who were tasked with evaluating a hypothetical purchase of that product. The participants who were told that the meat was 75% lean tended to be more positive about the product than the other group (25% fat). The order in which a given message is presented can influence a consumer's judgements or preferences, so marketers should pay attention to which framing effect is most salient.

Furthermore, the use of framing strategies is often behind the creation of news stories containing biased information that favor certain perspectives, points of view or ideologies. In this regard, in "The Empirical Approach to the Study of Media Framing" by Tankard²², several easily identifiable 'framing mechanisms' in headlines are listed and analyzed. One of the first examples highlighted is how the government and later the newspapers, at the time of the conflict with El Salvador during the Regan administration, treated the topic as 'a case of national security' and not as, for example, a conflict between a rich and powerful nation against a poor and economically weak one.

²¹ Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). *All frames are not created equal: A typology and critical analysis of framing effects*. *Organizational behavior and human decision processes*, 76(2), 149-188.

²² Tankard Jr, J. W. (2001). *The empirical approach to the study of media framing*. In *Framing public life* (pp. 111-121). Routledge.

In addition, Gamson and Modigliani's 'Media Package Approach' is described whereby, by coding certain keywords and common words, they are able to identify particular 'frames' used by journalistic heads.

Not infrequently in the field of digital journalism, this technique is used to manipulate information in an attempt to attract the attention of readers (often in a misleading manner): think of the creation of headlines whose main purpose is not to inform about the real content of an article, but to lead users to click on a certain link.

Several studies showed that framing effects occur even in the medical field and affect both doctors and patients. Based on their training, physicians are supposed to be impartial to different formulations of the problems that arise. For example, their choice should not change whether data are presented in terms of survival or mortality. As far as patients are concerned, there is more attention to how a message is formulated and how it influences the choice between different therapies.

An early study in the medical field was done by Mc Neil et al.²³, whose participants were business students, long-term patients and radiology doctors. Based on a set of statistical data on the results of surgery and radiotherapy, the participants, imagining that they had lung cancer, were asked to choose the most appropriate treatment for this disease based on cumulative probability and life expectancy. The authors expected physicians and students to be less influenced by variations in framing; instead, all three populations preferred surgery when treatments were identified rather than unidentified, when they consisted of life expectancy rather than cumulative probability, and when they were presented in terms of probability of survival rather than death.

²³ McNeil, B. J., Pauker, S. G., Sox Jr, H. C., & Tversky, A. (1982). *On the elicitation of preferences for alternative therapies*. New England journal of medicine, 306(21), 1259-1262.

4. How to overcome the framing effect.

But how can we overcome the framing effect by making more rational decisions? One solution is to reformulate the problem, the situation to overcome the bias that represents the framing effect. It is convenient to see it from all points of view, considering both the negative and positive sides. In this way we can make a more rational decision. This is also called double framing, studied by two psychologists at the University of Chicago, who submitted a group of students to a series of choices between two hypothetical (A and B) pharmacological treatments. If treatment A was presented in terms of benefits, 61 percent of respondents chose it. If it was presented in terms of losses, 73% of the students then chose treatment B. A third group, on the other hand, received the information both ways at the same time, in which case the preferences between treatment A and treatment B were evenly divided around 50%.

Another solution is to assume a necessary psychological distance. Becoming a kind of outside observer will allow you to take a more impartial position. By putting your emotions aside, you can better assess the situation cognitively, allowing you to analyze pros and cons. Interestingly, a research²⁴ conducted at the University of Chicago found that thinking in a foreign language eliminates the framing effect, probably because it allows us to assume an emotional and cognitive distance from the situation.

Finally, a last solution is to activate our thinking since the framing effect is due, in large part, to mental laziness or cognitive greed. In most cases we do not want to make effort and spend time analyzing all the factors, so we prefer to make decisions faster. This is not always bad, in some cases it can make us more effective by allowing us to achieve more results with less effort, but it is not always the case. When we have to make important decisions, we need to turn off this automatic thinking mechanism and carefully analyze the situation. This means asking questions, seeking more information and spending more time thinking about our response.

²⁴ Keysar, B. et. Al. (2012). *The foreign-language effect: thinking in a foreign tongue reduces decision biases*. *Psychological Science*; 23(6): 661-668.

Many studies have been carried out to investigate how to reduce the framing effect. Thomas and Miller²⁵ in 2012, show that through analytical processing, both older and younger people reduced the framing effect by using techniques that affected the accessibility of information to make a judgement, to make an unbiased decision. Basing judgements on the accessible characteristics of a problem is consistent with several theoretical models that have been proposed to account for the framing effect.

In particular, two experiments were carried out. Experiment 1 investigated whether biases in decision-making arising from the way problems are framed could be eliminated if participants were prepared to analyze expected values and were asked to perform either a calculation task or a memory task between decision-making blocks: the framing effect was eliminated in both age groups when participants were asked to complete probability calculations between blocks of decision-making trials. Experiment 2 aimed to examine the impartiality of participants in making decisions if they were instructed to use analytical thinking and were asked to think like a scientist or a gambler: this too was successful, showing a reduction of this cognitive bias.

In another study, it was shown how justifying one's choice in front of two or more options helps to minimize the framing effect. An experiment was conducted on a sample of 40 students who were asked, half of them, to justify their choice on the evaluation of a virtual product and the other half not to provide any explanation. For those 20 who provided justification it was noted that, in part, they overcame the effect distortion.

Sieck and Yates²⁶ (1997) shown that exposing one's concepts by writing them down, elaborating on information that is not easily accessible in texts, helps to weaken the framing effect. Furthermore, exposure increased the subjects' confidence in their

²⁵ Thomas, A. K., & Millar, P. R. (2012). *Reducing the framing effect in older and younger adults by encouraging analytic processing*. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 67(2), 139-149.

²⁶ Sieck, W., & Yates, J. F. (1997). *Exposition effects on decision making: Choice and confidence in choice*. *Organizational Behavior and Human Decision Processes*, 70(3), 207-219.

choices. A study²⁷ by Langer and Applebee (1987) also showed that writing helps us remember and understand a particular issue better. In fact, after a certain period of time, the participants remembered the contents of what they had read better after writing them down than those who had not.

In a 2012 study by Cassotti et al²⁸, the impact of emotions in decision-making was investigated. Participants were presented with positive or negative affective images, that is, pleasant or unpleasant pictures. They were then presented with a financial choice, unrelated to the previously provided images, framed in terms of both gains and losses. The experiment showed that how the information was presented no longer influenced the decisions of people who were subjected to emotionally pleasant images and decreased their risk appetite in the context of losses.

Another experiment²⁹ was conducted to understand the role of emotions in the context of framing and whether they can reduce it. A neuroeconomic gambling task was used in which outcomes were framed as gains or losses and participants were instructed on how to use cognitive reappraisal, i.e., reframing a situation to reduce its emotional impact, or expressive suppression, i.e., preventing behaviors related to certain emotions. The outcome was that reappraisal reduces the framing effect since it is associated with an increase in positive affect and a decrease in negative affect.

²⁷ Applebee, A. N., & Langer, J. A. (1987). *How writing shapes thinking: A study of teaching and learning*. National Council of Teachers of English.

²⁸ Cassotti, M., Habib, M., Poirel, N., Aïte, A., Houdé, O., & Moutier, S. (2012). *Positive emotional context eliminates the framing effect in decision-making*. *Emotion*, 12(5), 926.

²⁹ Miu, A. C., & Crişan, L. G. (2011). *Cognitive reappraisal reduces the susceptibility to the framing effect in economic decision making*. *Personality and Individual Differences*, 51(4), 478-482.

CHAPTER 3.

THE CASE OF THE PANDEMIC COVID-19.

1. Framing in real life.

The framing effect can also be found in everyday real life, from supermarket shopping to online shopping, from investment decisions to the covid pandemic. A simple example that can occur in everyday life to understand this effect is the following: let us assume that you can buy a calculator for 15 euros and a smartphone for 125 euros in the shop near your home; there is another option that allows you to buy the same items in a shop a little further away, where the calculator costs 10 euros (instead of 15) and the smartphone 120 (instead of 125). You are asked to buy one of these two items (whether discounted or full price) and choose where to compare it (whether near or far). In this example, distance is not relevant, but by making this assessment, one is more inclined to buy the calculator further away where it costs 10 euro, while the smartphone would be bought closer to home because between 120 and 125 euro makes little difference. Looking at the situation rationally, it is clear that the economic benefit is still 5 euros, but our mind goes to consider a relative benefit and therefore, 5 euros out of 15 represents a 33% discount versus not even 5% for 5 euros out of 125.

A particular type of framing effect that is still widely used is the "buy before it's gone" framing effect, which can be appreciated on Amazon Prime Day and on hotel, flight, and so on booking sites. The idea behind it is based on loss aversion, or the tendency to consider a loss more relevant than a gain of equal magnitude. In this sense, a shopping experience is structured around the specific frame of a loss that must be avoided at all costs. In supermarkets, we can see this effect mainly through attribute framing (which we discussed in the previous chapter), it means depending on how product characteristics are presented, consumers will be more or less likely to choose a certain product.

A 1995 experiment, also relevant today, by Ganzach and Karsahi³⁰ compares the impact of advertisements presenting the product in terms of gains associated with consumption and in terms of losses associated with non-use. Customers of a credit card company who had not used the card for three months were given a document explaining the benefits, both in terms of gains from using it and in terms of losses from not using it. For the next two months, the use of the card was monitored, showing that more than twice as many customers started using it in the loss-making condition than customers who were presented with a positive frame. This study also goes back to prospectus theory and in particular loss aversion, since customers are more influenced by the message with losses than the one with gains, and therefore more likely to avoid the consequences of not using the card, or rather, not to miss out on the benefits of using it.

Spain, like Italy, is a very attractive country for immigrants, so much so that hundreds arrive every year. Various media (including El País and ABC) and social networks (Twitter and Facebook above all) have analyzed this problem through a report³¹ in 2018 that shows how prejudices are created based on how information about the immigration phenomenon is provided and repeated.

In the financial sphere, one of the most common mistakes that investors come across is precisely the framing effect. One example is panic selling, a phenomenon that consists of selling financial instruments due to an unjustified fear of imminent drops in the securities one holds. This irrational choice, driven by emotions, can lead to large losses.

Even in social networking sites, such as Facebook, various marketing messages are placed according to the characteristics of each subject in order to encourage more purchases. This is because users value personalization, which influences their judgements. Sometimes, they perceive some products as customized even though they

³⁰ Ganzach, Y., & Karsahi, N. (1995). *Message framing and buying behavior: A field experiment*. *Journal of Business research*, 32(1), 11-17.

³¹ Tirado-Espín, A., Cuesta, U., Martínez-Martínez, L., & Almeida-Galárraga, D. (2021). *Framing and Immigration: New Frames in Media and Social Networks*. In *International Conference on Communication and Applied Technologies* (pp. 140-152). Springer, Singapore.

actually are not. Matching information to the psychological profile via digital documents (websites, social networks) makes it easier to convince consumers.

2. Bias with Covid-19.

The virus, which spread in late 2019, generated not only a biological pandemic but also a psycho-socio-cultural pandemic, which forced nations to take extraordinary measures.

Different nations adopted different confinement strategies, but all of them had to enforce the blockade through some form of public repression (enforcement of penalties for violations or police control interventions) because everywhere there was little willingness to comply with these public health measures. The United Nations drew attention to the imminent mental health crisis that could arise from the Covid-19 pandemic as a result of economic complications and the resulting psychological stress.

These observations led to analyzing the health crisis from a psychological point of view from two perspectives:

1. how psychological elements contributed to the spread of the virus;
2. what the psychological consequences of the post-crisis will be and what actions should be put in place to prevent these effects.

In response to the first point, Luzzo (2021)³² identified several cognitive biases that affected decision-making processes and emotional reactions, influencing the decision-making behavior not only of ordinary people but also of the leaders in charge of pandemic management. They are biases that influence leaders and public health officials in their choices during emergencies.

To react to these external dangers, especially during a crisis, our brain must process external data at maximum speed. In fact, in these situations, our cognitive system prefers speed (heuristics) to accuracy, leading us to make mistakes (biases).

³² Luzzo, D. (2021). *Come i bias cognitivi hanno contribuito alla pandemia SARS COV-2*. *Psicologia dell’Emergenza e dell’Assistenza Umanitaria*, 28.

Among the identified biases that have been most likely to induce rulers to make inappropriate decisions are:

- normalcy bias, that is the inclination to devalue and diminish warnings against a certain danger by underestimating its probability of occurrence;
- agent detection, that is the tendency to believe that a dangerous event and its threat are determined solely by the presence of external agents;
- the continuation bias of the plan, that is an error of assessment that does not allows the individual to recognize the inadequacy of the plan of action planned at the beginning of the event, due to the evolution of the event itself;
- the reactance bias, that is the tendency to behave differently from the behavioral indications given, in an attempt to prove one's freedom of choice;
- the Peltzman effect, that is the effect generated where a compulsory and not an optional protective measure is introduced, whereby risk perception decreases while the adoption of risky behaviors in the opposite direction to that prescribed by the norm increases;
- the Dunning-Kruger effect, that is the inclination of less experienced and competent people to overestimate their own knowledge and skills.

A second tool that could have reduced the spread of the virus, but was not used, is the study of crowd behavior, which in mass emergencies has improved the understanding of how people react to crises.

Italy offers us a practical example³³ of how social psychology and knowledge of crowd behavior could have slowed the spread of the virus: when the Italian government announced a transport blockade, there was a mass migration from the northern regions (where the virus was highly present) to the southern regions (almost devoid of Covid). This greatly increased the spread of the virus in Italy, creating social tensions between southern and northern Italians. Preventive measures such as a transport restriction in

³³ Drury J. (2020). *Recent developments in the psychology of crowds and collective behavior*. "Current Opinion in Psychology", 35, 12-16.

southern Italy or a long preventive media campaign to raise awareness among the Italian population would have been possible.

A positive side of this pandemic, as a study³⁴ from 2021 shows, is that the overconfidence bias in non-health domains has been reduced. Through a series of experiments on a group of students, overconfidence in decision-making was counteracted and more rational decisions were made. Specifically, exposure to public coughing weakened the overconfidence bias in subjects in two unrelated domains. Overconfidence is when your perception of these skills and abilities is overstated. An example of this is over-optimism, which has led individuals to underestimate the risk of the pandemic by not fully observing the preventive measures in place, and to underestimate their own personal risk compared to that of others. However, the increase in health problems and symptoms related to the coronavirus remind us of the risk of this disease, which leads us to be more cautious. Thus, in the context of Covid, coughing in public is seen as a health hazard and contributes to reduce overconfidence in other domains.

3. Framing effect with Covid-19

As we will see below, this effect was also manifested in this historical period with the Covid-19. Just think of how a piece of information is declined if the mortality or survival rate among infected people is highlighted. If, for example, it is said that in Italy the mortality rate is about 10 percent, one wants to emphasize the negative figure; whereas if it is said that in Italy the survival rate is 90 percent, one wants to emphasize the positive figure. These two ways of communicating, from a logical point of view, are identical, but from a human point of view they are different. Placing emphasis on one rather than the other produces different reactions that result in different choices.

³⁴ Li, H., & Cao, Y. (2021). *The bright side of the COVID-19 pandemic: Public coughing weakens the overconfidence bias in non-health domains*. *Personality and Individual Differences*, 178, 110861.

The pandemic put governments in a position to implement strategies to contain the damage to the economy and the health of citizens. In this context, people were influenced in their choices according to how a problem was posed. A study³⁵ in autumn 2021 assessed the extent to which people's preferences are influenced by different framings of equivalent scenarios. A kind of replication of Kahneman and Tversky's (1981) 'Asian disease problem' was carried out in Italy, one of the countries initially most affected by the pandemic. The objective was to test whether passing from a hypothetical to a real event remained the same responses (that is greater risk propensity in the negative frame and greater risk aversion in the positive frame) and to assess whether preferences involved health or wealth. For both, participants had to express their preference between equivalent risk aversion and risk seeking programs.

The experiment randomly presented to participating subjects via an online survey poses the following problem: *"Imagine that in autumn Italy should face a new wave of coronavirus infections and that it would be expected that this new wave could cause the death of 30.000 people. Assume that two alternative programs to combat the spread of the disease would be proposed and that the exact scientific estimates of the consequences of the two programs would be as follows."*

The first group must decide between:

1. Program A, which can save 10.000 people with certainty;
2. Program B, which has a 1/3 chance that all 30.000 people will be saved and a 2/3 chance that no one will be saved.

The second group, on the other hand, is asked to choose between:

1. Program A, where 20.000 people will certainly die;

³⁵ Olmastroni, F., Guidi, M., Martini, S., & Isernia, P. (2021). *Framing Effects on the COVID-19 See-Saw*. *Swiss Political Science Review*, 27(2), 257-270.

2. Program B, where there is a 1/3 chance that no one will die and a 2/3 chance that everyone will die.

FRAMING 1	PROGRAM A	PROGRAM B
SAVED LIVES	10.000	$1/3 \times 30.000 + 2/3 \times 0 = 10.000$

FRAMING 2	PROGRAM A	PROGRAM B
LOST LIVES	20.000	$1/3 \times 0 + 2/3 \times 30.000 = 20.000$

The same survey was conducted from an economic point of view (concerning job loss), both in terms of gain frame and loss frame. In particular:

1. Program A, where 200.000 people will save their job;
2. Program B, which has a 1/3 chance that all 600.00 people will save their job and a 2/3 chance that no one will save their job.

The second case was:

1. Program A, where 400.000 people will lose their job;
2. Program B, where there is a 1/3 chance that no one will lose their job and a 2/3 chance that everyone will lose their job.

FRAMING 1	PROGRAM A	PROGRAM B
SAVED JOBS	200.000	$1/3 \times 600.000 + 2/3 \times 0 = 200.000$

FRAMING 2	PROGRAM A	PROGRAM B
LOST JOBS	400.000	$1/3 \times 0 + 2/3 \times 600.000 = 400.000$

The results show that in the health scenario, risk seeking is higher in the negative frame with 59% of voters choosing schedule B (versus 41% schedule A), while only 28% in the positive frame chose schedule B (72% chose option A). A higher risk inclination also

prevails in the economic scenario in the loss frame; however, the percentage is lower (53%).

As we can see from the respective tables, even in these two cases the expected value is equal and the situation is exactly the same, only posed differently. People, if they were fully rational, should answer the same. Therefore, based on hypothetical but estimated data based on deaths and job losses to that date, we can conclude that even in a real event such as Covid-19 risk seeking prevails in the negative picture and that the framing effect is stronger when it comes to lives (health) than when it comes to jobs (economy/wealth).

Over the years, the Asian Disease Problem has been proposed in different country contexts, addressing different problems and with different participants. It has been noted that there are several factors that influence the framing effect including: scenarios involving human lives give stronger choice reversal results than economic scenarios; writing 'not saved' and 'saved' instead of 'dying' and 'not dying' reduces the framing effect.

A 2021 article³⁶ analyzed whether how a message was framed, by mass media and social networks, affected self-care behaviors (washing hands, being spaced out, staying at home) regarding Covid. Changing one's habits is essential for managing the pandemic, helping to decrease the number of infections and the pressure on hospitals. Specifically, 319 participants were asked to choose the message that most led them to adopt these behaviors. Results showed that a gain frame, which emphasizes benefits, increased self-care and that health messages framed by losses increased risk perception. In line with numerous researches I have delved into, it is also noted here that positive (gain) frames are more effective in incentivizing low-risk behaviors, while negative (loss) frames provide more incentive for high-risk behaviors.

³⁶ Gantiva, C., Jiménez-Leal, W., & Urriago-Rayó, J. (2021). *Framing messages to deal with the COVID-19 crisis: the role of loss/gain frames and content*. *Frontiers in psychology*, 12, 568212.

Also, a study³⁷ was conducted in China in 2021 on the public's intention to receive vaccination and understand the key factors that determine that choice, based on how information was provided and understanding the factors that motivated them to do so. Two online questionnaires were distributed under the two different frameworks, from 31 March 2021 to 30 April 2021. The results showed that when information was provided under the loss frame, people were more likely to vaccinate than under the gain frame, and that there were no particular differences between gender, age, income, occupation, etc.

Based on how the message is framed, two ways of behaving come into play. In a gain frame, if you use the mask, you can block the spread of the virus via the oral route; in a lost frame, not using the mask is likely to contract the virus. A positive picture is more effective when it comes to preventing a disease, while a negative picture is more convincing in detecting a disease. Good individual awareness about covid and observing current government regulations help to manage preventive behavior more effectively.

Another study³⁸ says that if a person one trusts (close friends or family members) or a public figure vaccinates, this positively influences people's willingness to vaccinate. In particular, 78% of the respondents stated that the decision to vaccinate was supported by friends and relatives and, there is a link in the gain frame but no data in the loss frame. This is probably because people have to deal with the risks to their health regardless of whether friends or relatives have vaccinated. Overall, the impact of the loss frame on the intention to vaccinate is higher than that of the gain frame, as Covid infection can have serious consequences (losses) while it is difficult to believe that the vaccine can produce immediate effects or long-term benefits (gains).

³⁷ Peng, L., Guo, Y., & Hu, D. (2021). *Information framing effect on public's intention to receive the COVID-19 vaccination in China*. *Vaccines*, 9(9), 995.

³⁸ Bell, S., Clarke, R., Mounier-Jack, S., Walker, J. L., & Paterson, P. (2020). *Parents' and guardians' views on the acceptability of a future COVID-19 vaccine: A multi-methods study in England*. *Vaccine*, 38(49), 7789-7798.

A high level of vaccine efficacy will condition people's willingness to vaccinate. A study³⁹ in China shows that a longer duration of vaccine protection leads to greater parental approval, among doctors and nurses, of vaccination against Covid for their children under the age of 18. Initially, it was only 44.5% of parents who considered it likely that their children would be vaccinated; subsequently, the increased efficacy and duration of the vaccine, the possibility of preventing further outbreaks, led to a significant increase in vaccine acceptance. When it comes to children and adolescents, it is often the parents who influence their choices or decide for them, so it is important how a given message is put to them.

In addition, social networks can also influence parents' choice to vaccinate their children; nowadays, people often look at the behavior of their peers, friends they follow on social networks, which are considered more credible than other types of sources.

Two studies, respectively targeting parents in England and working parents in China, showed that positive messages in favor of vaccination, such as the fact that the vaccine can protect their children and return them to normal life, led to greater acceptance by parents; whereas messages in negative terms, related to the safety and efficacy of the vaccine, were negatively associated with vaccination by parents.

In the United States⁴⁰, during the pandemic, it was important to send consistent messages to citizens to encourage them to maintain a greater social distance. Public health frames positively influence people to avoid unnecessary travel and activities; conversely, economic frames encourage unnecessary travel and negatively affect social distancing. In addition, people who read the news more were more vulnerable and showed greater signs of depression. Therefore, the media played an important role in how people experienced the pandemic and the resulting restrictions.

³⁹ Wang, Z., She, R., Chen, X., Li, L., Li, L., Huang, Z., & Lau, J. T. (2021). *Parental acceptability of COVID-19 vaccination for children under the age of 18 years among Chinese doctors and nurses: a cross-sectional online survey*. *Human Vaccines & Immunotherapeutics*, 17(10), 3322-3332.

⁴⁰ Deslatte, A. (2020). *To shop or shelter? Issue framing effects and social-distancing preferences in the COVID-19 pandemic*. *Journal of Behavioral Public Administration*, 3(1).

4. Uncertainty and decision making during a crisis.

Uncertainty is an important concept in decision theory and behavioral finance and economics since it complicates the decision-making process. While standard (neoclassical) utility theory provides arguments for rational behaviors when there is no uncertainty involved, expected utility theory is developed as an extension of the standard utility theory to incorporate uncertainty into the standard framework.

Uncertainty is perceived by the non-expert as a more neutral concept where outcomes can be quantified or can't be identified with losses or gain. When you say uncertainty usually it's referred to a general lack of knowledge, not just you don't understand but also others lack this knowledge. So, all the agents lack the knowledge about what happened, the likelihood and the possible outcomes.

The concept of uncertainty is different from that of risk. Risk for economics are situations that can have positive or negative implications for which we have precise probability distributions of outcomes are known. For people risk mostly has negative consequences.

When you speak about feeling of uncertainty, you're doubting about your knowledge and how this knowledge can help you understand what can happen in the future. The value in which way knowledge can fail it's related to the fall of knowledge. The fact that we believe the information to be useful but cannot be so.

Uncertainty is precisely the word we were faced with the outbreak of the pandemic, as it was the first time we were faced with such an event not knowing what to do about it. Governments did not know how to react, how to try to make the best decisions for their country. The fact that many patients were asymptomatic added to the level of uncertainty. In addition, we were initially without a vaccine, and therefore without weapons to fight the pandemic, contributing to a sense of anxiety and fear in people. On these occasions we tend to get confused without analyzing all the possible alternatives but take what comes to mind as a model of reference. On some

circumstances this can be useful (especially when we have little time to decide), but on others it can lead to serious mistakes, wrong choices.

People often let their emotions guide them in making decisions, even more so in times of crisis and, in risky situations, reacting emotionally is the simplest choice and most in line with the human cognitive system. When the control of emotions is low, the perception of risk takes over in determining behavior (a high perception leads to more restrictive measures and vice versa); whereas, when there is good control of emotions, the impact of the perception of risk is less. In fact, when the national lockdown was imposed, these types of people put in place several protective measures independently of their perceived risk, without following an emotional impulse to respect them.

Policy-making in these contexts is very complicated, since you are dealing with people's lives, you are in a state of high uncertainty and under time pressure. Particular attention has been paid to how policymakers have handled this situation and how various decisions have been made. We see how decision theory, which is divided into normative (analyzing the consequences of a choice or defining the best decisions under various restrictions or assumptions) and descriptive (analyzing why one choice is made rather than another), helps to make better and more transparent decisions. Faced with the potential scenarios that the pandemic puts before us, one might try to make decisions by balancing alternatives or embracing one of them completely.

In general, when a new disease appears, decision-makers can take measures in advance to stop its spread (for example, isolation of confirmed and suspected cases); later, if this fails, they must analyze better solutions to mitigate its spread (ban on gatherings, closing schools, etc.). Some choices, however, may have negative consequences on society, both from a work and mental point of view. Quantitative models are often used to help make policy decisions by combining what is known from the past with present information on the epidemic. However, one has to be careful of information overload that could complicate the identification of useful evidence.

There are three levels of uncertainty that can lead decision makers to better understand the measures to be implemented and these are: uncertainty within models, uncertainty between models and uncertainty about models. Decision theory offers several rules for making decisions under conditions of uncertainty and it is up to the decision maker to choose the most appropriate one according to his characteristics. Using this theory, especially during a crisis such as the Covid-19 pandemic, will increase credibility by giving more consistency to the actions taken. Furthermore, exposing the various uncertainties in a way that captures their possible impact helps to improve the choice process.

Conclusion

The framing effect has existed for many years and affects everyone, regardless of gender, age, ethnicity, occupation, or field of application. The pandemic was just one more proof that we can see this phenomenon in any sphere, in any kind of event. In particular, the pandemic brought out even more of the emotional side of people, which is used to influence them in their decisions, often not making them make the most rational decision. Setting a message by emphasizing positive features (lives saved) leads to a certain choice; conversely, exposing a negative picture (lives lost) leads to quite different decisions. This, although the problem at hand is exactly the same.

We could see how, in addition to ordinary people, decision makers were also unconsciously influenced by various biases in their decision-making processes during the pandemic. Moreover, the present work has shown how persuasive messages rely precisely on the effectiveness of this effect to lead people to a particular choice.

Therefore, in situations such as this one of full uncertainty and difficulty in making decisions, it is important to try to carefully analyze the situation from all points of view and with the right psychological distance so as not to get too involved with emotions, thus avoiding falling into cognitive bias, and take a more unbiased position.

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