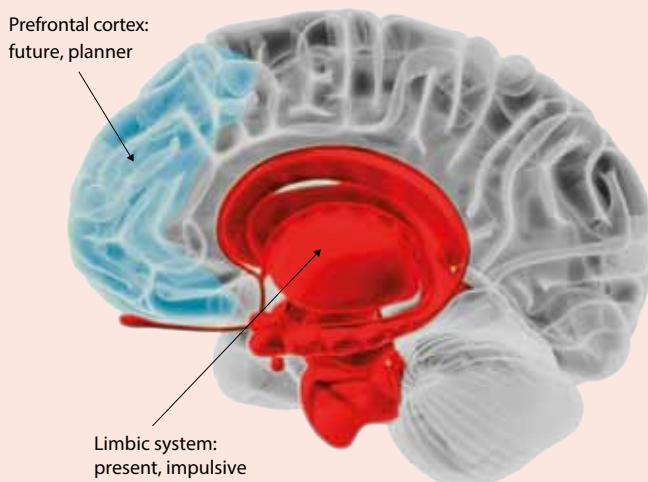


## ECONOMY AND EXPECTATIONS: FACE-TO-FACE

## From expectation formation to decision making

A human brain weighs around one and a half kilograms, while that of our closest primates weighs only half a kilogram. Often, size does not matter, but in this case the difference is the result of the greater development of the brain's prefrontal cortex, which is what gives us a uniquely human characteristic: the ability to carry out complex planning. As humans, not only do we live in the present, but we also plan for the future, and in quite some detail too. It is in our nature, or rather, our brain. However, this particular characteristic coexists with another more emotional and primitive one, linked to the brain's limbic system (see image below).

### *The human brain: the planner and the impulsive person in us*



Source: CaixaBank Research.

At this point, you may be wondering whether, after more than 40 years writing about economics, we have moved on to writing about psychology or neuroscience. The answer is «no», although not a very resounding «no», because over the next few pages we will try to understand some of the principles that determine human behaviour. As economists, we have had to refer to these disciplines to properly understand how we, as humans, make decisions.

### Rational expectations and cognitive biases

For decades, most economists took for granted that as individuals, we take decisions in a rational way. Using a somewhat more technical vocabulary, which highlights the sacrilege committed by the profession, it has been assumed that people act efficiently, based on all the available information and selfishly. Although it is hard to believe, the truth is that the use of the rational paradigm has helped to quite accurately describe many of the decisions we make, and this has enabled us as economists

to use the rational paradigm for decades as one of the cornerstones on which to base economic analysis. Nevertheless, over time the limitations of the use of this paradigm have been revealed.

The coexistence of a highly-evolved part of our brain which is focused on planning (the prefrontal cortex) with another more primitive part that seeks more immediate gratification (the limbic system) gives rise to behaviours that cannot be explained with the rational paradigm. These deviations from the paradigm, or cognitive biases, have been studied extensively by psychologists such as Amos Tversky and Daniel Kahneman, as well as by economists such as Richard Thaler, and their studies have given rise to what is known as behavioural economics. Below, we set out some of the most important cognitive biases on which behavioural economics is based.

The first non-rational behaviour to point out is related to the limited capacity for self-control that the vast majority of humans have. This is perfectly reflected in the marshmallow experiment, which the psychologist Walter Mischel carried out in the 1960s in the US. The test involved taking a four-year-old child to a room where there was a marshmallow and giving the child the option either to eat it immediately or to wait for 15 minutes without eating it, in which case they would be rewarded with an extra marshmallow. The result: 70% of participants were not able to resist the temptation. This may seem like a very different situation to those we usually present as economists, but what if we replace the four-year-old child with a 30-year-old adult, the sweet on the table with a new car and the two sweets after 15 minutes with greater spending power in old age? What would you say would be the result?

Beyond the self-control problems, there are other cognitive peculiarities that will no doubt be very familiar to you, since we all suffer them to a greater or lesser extent. One of them is the aversion to loss, a very common trait. Kahneman and Tversky show us this trait with a simple exercise: if someone proposed to toss a coin and, if it were heads, you had to pay 100 euros, how many euros would you need to obtain if it were tails for you to be willing to play? Most of us would ask for more than 200 euros, since we feel the loss stronger than we feel the gain.<sup>1</sup> This disparate assessment of gains and losses gives rise to behaviours that are very different to those we would observe if we behaved rationally, and we can frequently see them in the financial markets, for example.

The simplification of complex decisions in simpler problems also tends to result in different behaviours to those we would observe if we acted rationally. Daniel Read, George Loewenstein and Matthew Rabin coined the term «narrow bracketing» to describe this way of behaving. For example, Richard Thaler argues that we often classify our money into different accounts, or mental categories, in order to simplify our financial decisions (mental accounting, as he calls it). He points out that we sometimes use this compartmentalisation as a self-control mechanism to deal with the «impulsive and live for the present» person in us, who wants to consume more than we can afford, and the «future planner» in us.

Finally, over-investment behaviour fits perfectly with our confirmation bias, which drives us to seek out information that confirms our way of thinking, and with our confidence bias, as a result of our excessive belief in our own abilities when it comes to making future projections.

Although the list of cognitive limitations is longer, those outlined here provide a good sample of the ones that are most common and are generally more detrimental to our financial decisions. How much we consume, save, work or what we invest in is subject to these limitations. As such, the design and implementation of public policies must take these biases into account.

### **Making consumption, savings and work-related decisions**

Looking in more detail at the economic level, and as we mentioned at the beginning, most economic models assume that we make decisions rationally. One of the areas in which this assumption has caused the most controversy is in the study of the big savings and consumption decisions we make throughout our lives. According to the life cycle theory of consumption developed by Franco Modigliani and Richard Brumberg, if we acted rationally, we should maintain a highly stable level of consumption over time. To achieve this, we would generally borrow in our youth, save for the rest of our working lives and, finally, reduce our savings during retirement in order to consume.

However, the savings we accumulate during our active lives are often insufficient in order to maintain a stable level of consumption after retirement. In fact, the impulsive person in us tends to outweigh the planner in us, and we sometimes succumb to the temptation to satisfy our desires immediately, just as the marshmallow test demonstrated, rather than increasing our contributions to our pension plan. As they say, «a bird in the hand is worth two in the bush».

Furthermore, much of the economic literature that analyses the savings and consumption decisions of households has been based on the expected utility hypothesis described by Von Neumann and Morgenstern, which assumes that individuals make decisions by evaluating all possible contingencies in a rational manner.

Despite this, our aversion to loss makes us invest a greater proportion of our savings in safe assets than we would if we behaved rationally. That is, our investment portfolios should include assets with a higher expected return, even if they are riskier (see the article «Expectations, inflation and financial markets: an exciting trinomial full of surprises» in this Dossier, for more details). Another consequence of our aversion to loss is the prudence we show before changing jobs or setting up our own business. With rational expectations, we should observe much more mobility in the workforce and the creation of many more new companies, but our bias towards the *status quo* drives us to stay in our current job or to not follow through on that fantastic business idea we have in our head.

1. See D. Kahneman and A. Tversky (1979), «Prospect Theory: An Analysis of Decision Under Risk», *Econometrica*, vol. 47, 263-291.

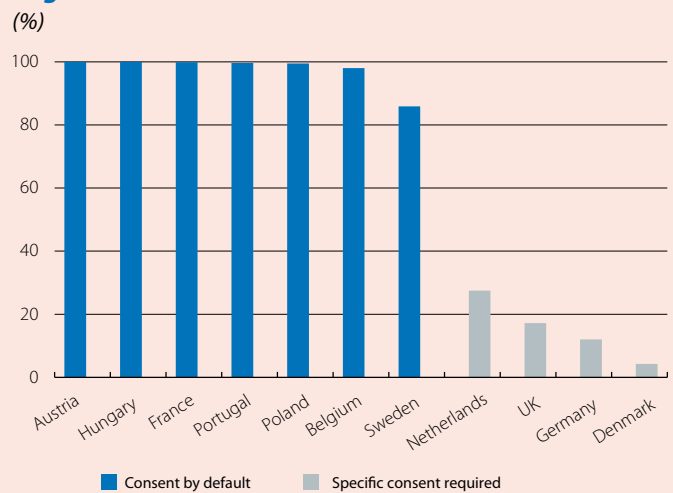
In the same way, our bias towards compartmentalisation encourages us to buy on credit and, at the same time, to save in a bank account. This simplification of financial decisions also often leads us to establish a fixed monthly amount of savings, despite the fact that our income and especially our expenditure fluctuate throughout the year, meaning that the optimum amount to save should be different from month to month.

Another example of compartmentalisation or simplification of financial problems is provided by New York taxi drivers.<sup>2</sup> As Thaler and his co-authors pointed out in a well-known article that was published in 1997, many taxi drivers set themselves a daily income target and worked to achieve their goal, regardless of demand. However, if they worked a fixed number of hours each day, with the same number of hours their income would increase by 5%. Furthermore, if they decided to work more hours on days with higher demand and less on quiet days, their monthly income could increase by 10% (with an equal number of hours worked in the month in total). This is why the company Uber, for example, tries to incentivise its drivers to make a more rational decision by increasing prices when there is more demand: in this way, it incentivises drivers to work longer hours when there is higher demand.

### Public policies and the «nudge»

In light of these tendencies, it may be that we sometimes need a «nudge» to make more rational decisions or to not postpone those that we prefer to avoid. This is particularly relevant when it comes to designing public policies: assuming that individuals have rational expectations when, in fact, they do not can lead to policies not having the desired effects. A clear example of this nudge, also referred to as libertarian paternalism by Richard Thaler, is consent by default in organ donation. In countries where explicit consent is required for organ donation, the percentage of donors is very low, whereas if consent is given by default, practically all citizens donate their organs (see first chart). Thaler explains how designing public policies that are minimally invasive but encourage individuals to make more rational decisions can have a very significant impact. This is an increasingly important area in public policy design, particularly in the US and the United Kingdom.

### Organ donation consent rate



Source: CaixaBank Research, based on data from Johnson, E. and Goldstein, D. (2003), «Do Defaults Save Lives?».

Going back to decisions related to saving for old age, a public policy that is often proposed to counteract the low level of savings that can be seen in several developed countries is to increase company pension plans. However, if this type of action were proposed, the way in which it were implemented would be key to its success. If individuals have to check a box to opt in to the plan, the proportion of people who sign up would most likely end up being much lower than if registration were by default (i.e. individuals have to check a box to opt-out). In the US, when the default option was changed to automatic enrolment, the rate of subscription to company pension plans went from 49% to 86% and no decline was noted in savings placed in other types of instruments.<sup>3</sup>

A somewhat more sophisticated strategy to overcome problems of self-control, but one which is very effective at encouraging people to save for old age, is the «Save More Tomorrow» – or SMaT – programme, designed by Thaler and Shlomo Benartzi. Under this programme, individuals must decide today what portion of the salary increases they might potentially receive in the coming years to allocate to savings. In this way, the decision is easier because it does not involve an immediate reduction in consumption and, when savings are increased, it is more acceptable since it coincides with an increase in salary and occurs

2. See C. Camerer *et al.* (1997), «Labor Supply of New York City Cabdrivers: One Day at a Time», *The Quarterly Journal of Economics*, vol. 112(2), 407-441.

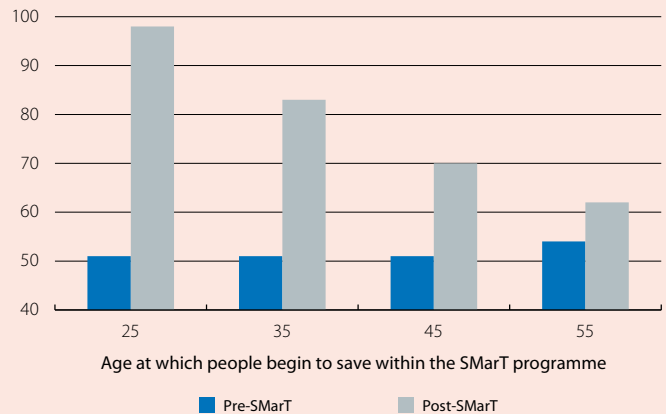
3. See B.C. Madrian and D.F. Shea (2001), «The Power of Suggestion: Inertia in 401 (k) Participation and Savings Behavior», *The Quarterly Journal of Economics*, vol. 116(4), 1.149-1.187.

automatically. The two economists who developed the programme estimated that, with a gradual increase in the savings rate from the current 4% of salary up to a maximum of 14% for a worker with an annual income of 50,000 dollars, the replacement rate (i.e. the ratio between a person's initial pension and their salary prior to retirement) would increase from 51% to 98% if they enrolled at age 25 (see the second chart). It is important to note that the SMarT programme manages to significantly increase the level of savings, despite giving individuals the freedom to leave the savings plan at any time.

In short, although rational, we humans also make decisions impulsively, which sometimes makes it difficult for us to achieve our desired objectives. What's more, if the heart has reasons that defy reason itself, we must learn to speak to it in its own language. Perhaps that way, we will be able to convince it, whether it is signing up for a pension plan or starting a business.

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### Post-retirement replacement rate according to participation in the savings programme (%)



**Note:** Ratio between the initial pension and the salary for a worker with an annual income of 50,000 dollars, according to the age at which they begin to save within the SMarT programme. The blue bars represent those who have not saved through the SMarT programme, while the grey bars show those who have.

**Source:** CaixaBank Research, based on data from R. Thaler and S. Benartzi (2004), «Save More Tomorrow: Using Behavioral Economics to Increase Employee Saving».