

1. Understanding financial behaviour for better policy making: an introduction¹

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We must develop a theory of what he intends, simultaneously giving content to his attitudes and his words. Because we need to give meaning to his words, we will propose a theory that recognizes him as a coherent person, who believes in truth and loves good.
Davidson (1970, p.253)

1. INTRODUCTION

In 1994, *The Economist* asked members of four groups, four former finance ministers from OECD countries, four chairmen of multinational companies, four students of economics at Oxford University, and four London dustmen to provide their forecasts for four items: the average growth rate of OECD countries, average inflation, the price of petrol in the coming year, and the year when Singapore's GDP would overtake Australia's. Who made the worst forecasts? Not the dustmen, but the former finance ministers. The dustmen and the company managers actually identified the most accurate scenarios.

The results of these tests, and those of many others, should certainly make us sit up. Our savings, and the economic policies of governments and large companies depend on analyses and forecasts that prove unreliable. Goldman Sachs, Credit Suisse, UBS, Citigroup, Morgan Stanley, JPMorgan Chase, Deutsche Bank, Bank of America and numerous other institutions in the world employ hoards of analysts to predict the future, who are systematically proven wrong by reality. We can take some recent examples. In 2009, Morgan Stanley predicted that inflation would be low in China, and instead it reached a peak of 5 per cent in 2010. Goldman

¹ The current chapter represents a modification of Viale (2012, chapter 11). I thank Shabnam Mousavi for her precious editorial support and Barbara Alemanni and Umberto Filotto for their interesting advice.

Sachs guaranteed that China would grow by just 6 per cent in 2009, and instead it reached 9.3 per cent. For the United States, low interest rates were forecast for 2011, as an effect of quantitative easing, that is, the increased money supply decided by the Fed. Instead, so far this very measure has brought an increase in the rates of 10-year bonds of 2.5 to 3.5 per cent.

What is more striking about the incorrect forecasts is the impudent way that analysts glibly adjust their mistakes after the event, as if nothing has happened. In October 2010 Goldman Sachs forecast that the American economy would slow down from a growth rate of 2.6 to 1.8 per cent. In December 2010, they had already changed their estimate, increasing it by 40 per cent, predicting that the United States will grow by 2.5 per cent at the beginning of the coming year, and can go up to an average for the year of 4 per cent. Financial forecasts as such seem to be absolutely useless.² Philip Tetlock (2005)³, a psychologist at Berkeley, analysed 82 361 forecasts by 284 professional analysts. The forecasts contained in this study were so inadequate that they were surpassed by the casual forecasts made by “dart-throwing monkeys”, that is, by the darts thrown at a blackboard by a group of monkeys.

² We must ask ourselves one question: what are financial forecasts for if, as we have shown, they are not generally reliable? We suspect that their role may be to create that imitative behaviour that is gradually transformed into herd behaviour from which careful speculators can make enormous profits. Many years ago George Soros, in a private conversation, told me that when he invests he does not look at analysts' numbers, but tries to empathetically interpret what the other small, medium and large investors who read those numbers will do. Interpreting what the herd is thinking, trusting analysts' estimates and being prone to fall into the many cognitive traps, has enabled smart financiers like George Soros to make their fortunes. By empirically anticipating the hypotheses of behavioural finance!

³ An important and underreported conclusion of that study was that some experts do have real foresight, and Tetlock has spent the past decade trying to figure out why. What makes some people so good? And can this talent be taught? In *Superforecasting*, Tetlock and co-author Dan Gardner (2015) offer a masterwork on prediction, drawing on decades of research and the results of a massive, government-funded forecasting tournament. The Good Judgment Project involves tens of thousands of ordinary people – including a Brooklyn filmmaker, a retired pipe installer and a former ballroom dancer – who set out to forecast global events. Some of the volunteers have turned out to be astonishingly good. They've beaten other benchmarks, competitors, gurus, and prediction markets. They've even beaten the collective judgement of intelligence analysts with access to classified information. They are “superforecasters”. Tetlock and Gardner show that good forecasting doesn't require powerful computers or arcane methods. It involves gathering evidence from a variety of sources, thinking probabilistically, working in teams, keeping score, and being willing to admit error and change course.

2. SEMANTIC AND PRAGMATIC ANCHORING

Social reality is too complex; there are too many initial conditions to take into consideration and, above all, it is the kingdom of ontological uncertainty, that is, there is never any regularity in the phenomena. So all “forecasters” can do is to extrapolate arbitrary regularities from contingent trends, relying only on small samples,⁴ and project them into the future. This is what financial analysts do all the time, cloaking their products behind the label of scientific analysis. The forecasts mentioned are the product of this fallacious methodology.

But the error is magnified if we consider a recurring bias that forecasters fall into systematically. When they select the data on which to base their projections, they are unconsciously conditioned by what is known as the anchoring and adjustment heuristic. This describes the individual’s tendency to perform a numerical estimate in two steps. First he anchors himself to some initial value, which is then corrected in the most plausible direction, up or down. This heuristic produces a chain reaction: the saver is anchored to the forecasts of the bank analysts, who are themselves influenced by the news from economic journalists, who are conditioned by the numbers of the analysts of the large merchant banks, which are influenced by the forecasts of the rating agencies or the assessments of international financial institutions, themselves anchored to present and immediately past stock values and prices. The anchoring effect is produced very subtly and unconsciously. Some experiments have shown that even non-pertinent data such as a telephone number or social security number can influence the numerical evaluations of completely different topics like the evaluation of a house or a consumer product.

What is more, the way the data are presented also has a powerful effect.⁵ Tversky and Kahneman (1974) asked two questions about the trend of the Dow Jones Index which were semantically the same but differed in the manner of their presentation, and obtained different results. The framing of the second question, which contained numerical information, acted as an anchor which automatically influenced the reply, hooking onto the numbers read. This phenomenon emerges in many financial decisions, such as the choice of a form of financing or insurance cover, because most financial and welfare products focus attention on specific threshold values.

⁴ Small samples that are not representative of the financial phenomena and that therefore cause variance.

⁵ One of this effects is called priming. Priming is a psychological phenomenon whereby exposure to one stimulus influences a response to a subsequent stimulus, without conscious guidance or intention. Priming can be perceptual, semantic or conceptual.

Another phenomenon studied in recent years that influences anchoring is the order in which data are presented. Generally speaking, it seems that the first data have greater weight in terms of the formulation of a judgement (priority effect) while the last are remembered better (recency effect). But it appears that in some cases the recency effect prevails as an anchorage. The problem is that the prevalence of one of the two effects seems to depend on the complexity of the task, the amount of information provided and when the opinion is formulated (if it is formulated after the data are communicated or gradually as they are presented).

In general, when faced with a range of information, the individual follows conversational and epistemological maxims of interpretation. *Conversational maxims* were introduced some time ago in 1993 in the studies of Paul Grice (1989) and subsequently developed by other scholars like Dan Sperber and Deirdre Wilson. One of the basic principles is that of cooperation. When one speaks elliptically, omitting some passages and leaving areas of shadow, the listener will complete the semantic gaps with inferences known as *conversational implicatures*. For example, if one person says: “The Monsanto share is growing strongly, but it is a technological share”, the listener will assume from the “but” that the speaker intends to underline that in these times of financial crisis and recession, the fact that it is a share in a company with a high intensity of biotechnological research, may make it more fragile compared to shares in less cyclic or more stable sectors like foods. Apart from these pragmatic conversational maxims, according to some epistemologists like Donald Davidson (1970, 1980, 1984) and Daniel Dennett (1981, 1987), we apply other logical and epistemological principles to our interpretation. For example, we try to give *logical consistency* when we are faced with muddled and disjointed expressions, phrases and texts. We also assume, if there is no evidence to the contrary, that whoever is speaking to us is telling the *truth* when he makes statements that at first sight appear unrealistic.

Conversational maxims and principles of consistency and truth help us to construct a story with causal links to the text that we are reading or that is communicated to us. Recent research shows that constructing a consistent and comprehensive story is necessary to take decisions. The problem is that the individual is not always able to make a complete reconstruction and sometimes remains anchored to the way information is presented. For example, if two different presentations are made of a company – one orderly and historical from the past to the latest results, and the other muddled – and a sample is asked to predict its performance on the Stock Exchange, only the first report allows the important element of performance to be fully used. In the case of the muddled reconstruction the individual is more influenced by variables other than the results. What does this tell us? That if one tries to anticipate the actions of investors, analysts

and savers, it is not enough to know what information they have but also how this was communicated to them, and therefore the “story model” that they have constructed mentally. Depending on the model, some variables are more important in determining an opinion and the consequent decision.

2.1 Loss versus Gain

The importance of the order in which information is presented, and the pragmatic dimension of communication are linked to another powerful effect connected to the way data are presented. Classic experiments carried out by Kahneman and Tversky (1979a) have highlighted the fact that in tests that present the same monetary value of the stakes, if the question is posed as a gain, the answer tends to present an aversion to risk, whereas if the question is perceived as a loss, the individual decides with a propensity to risk. This phenomenon, known as the *framing effect*, leads to an inversion of the preferences when the same problem is framed differently. This inversion, called the *reflection effect*, proves to be a very powerful phenomenon in economic behaviour. People decidedly increase their propensity to risk when they interpret the situation in terms of loss, while they are averse to risk if the situation is presented as a gain.

As Fyodor Mikhailovich Dostoevsky asked in *The Gambler*, when is the irrational escalation behaviour that takes a gambler to bankruptcy manifested? Towards the end of the evening, when the gambler perceives that the day is closing at a loss and he wants to overturn the result by increasingly risky behaviour. The same attitude was noted in a series of studies of the banking and financial world of Wall Street and other international stock markets. When the Stock Exchange adds up the gains and losses at the end of the day, there will be a greater trend on the part of traders to take risky decisions if negotiations have not gone well during the day. The same also happens when the Stock Market opens the following day; focusing on the losses and overlooking the gains will also generate risky investment behaviour.

The different psychological impact of a loss as opposed to a gain is represented by *prospect theory* (Kahneman and Tversky, 1979b). The value function of this theory abstracts this aversion to loss. The value of this coefficient is equal to two: in other words, to put it simply, one has to gain approximately 2000 euros to compensate for the annoyance of having lost 1000.⁶ This value function, which differs from that of neoclassical economics which presumes a coefficient of one, explains much economic

⁶ David Gal and Donald Rucker (forthcoming) publish in the *Journal of Consumer Psychology* a critical review on loss aversion that aims to prove that it is a fallacy. That is,

behaviour that violates the forecasts of economic theory. First of all, it explains the difficulties of negotiation between the purchaser and the buyer: the seller who deprives himself of an asset, values it much more highly than his counterpart who purchases it, who must deprive himself of his money. In addition to this, each of the parties perceives the concession made to the other as a loss, thus attributing greater weight to it than to a potential gain.

An *aversion to loss* also produces the well-known *disposition effect*, that is, the tendency to sell shares too soon whose prices have risen, but to hold on to shares that have lost value. In some analyses by American and Israeli fund managers, we can note a systematic tendency to the *disposition effect*, which damages their performance. The best managers are those that have shown the greatest ability to realize losses. Is it only aversion to loss that is responsible for this behaviour? No, various studies seem to show that *anticipated regret* for the loss of possible future earnings prevails, determining the disposition effect. In other words, as often happens in our decision-making processes, we usually reason counterfactually, asking ourselves what could or should have happened if we had taken a different decision. In this case, the alternative hypothesis that a share sold at a loss might regain value triggers regret that prompts us not to sell. Anticipated regret for a possible loss has a value several times higher than the annoyance due to an actual loss caused by remaining inactive.

2.2 Affect, Emotions and Heuristics

The regret illustrated in the previous example opens the discussion of an increasingly important chapter of economic psychology and behavioural finance: the role of affect and emotion in judgement, choice and decision (Gigerenzer, 2007). The issue has been overlooked for many years by cognitive psychology due to the methodological difficulties of studying it. Today, on the other hand, it is becoming central in most fields of psychology. Daniel Kahneman himself, in his Nobel Lecture of 2002, clearly underlines that it is important to refer to two types of cognitive processes. There is System 1 – or the emotional and intuitive mind – which thinks rapidly, without effort, in an associative, tacit, automatic and parallel manner, while System 2 – or the reasoning mind – thinks more slowly, in a serial, conscious way, expending energy and respecting the rules (Kahneman, 2011).⁷

that there is no general cognitive bias that leads people to avoid losses more vigorously than to pursue gains.

⁷ There is a growing critique to the dual model of mind. Many psychological and neural data seem to show that it is unlikely that the mind should be divided in two systems

The so-called System 1 is proving increasingly to be the submerged part of the iceberg. Its “pervasiveness” is expressed in all aspects of human behaviour and even more so of economic and financial behaviour. If we wish to conventionally break down the components of behaviour into judgement, decision and action, we can see that many past hypotheses in the explanation in each of these stages have been revised in the light of the affect and emotion variable. This has led some people, like Paul Slovic, to introduce the concept of an “affect heuristic” (Slovic et al., 2001) and Antonio Damasio (1994) to talk of “somatic markers” in decision-making. For example, affect plays a role in the value function (utility) and the pondering of probabilities. Subjective probabilities are not independent of the affective nature of outcomes. A 1 per cent probability is greater when the outcome has a significant affective component rather than a poor affective component. The subjective perception of probability depends on the affective value that the individual associates with the expected results. While the theory of utility maintains that utility and probability are independent, the results of some research show that they are not. The low probabilities have a greater weight when the expected positive or negative results trigger sentiments of hope or fear. This phenomenon has obvious consequences for the judgement that lies at the basis of one’s economic and financial choices, between options with different probabilities and expected utilities. As we have seen earlier, even loss aversion, regret and the *endowment effect* (that is, attributing greater value to an asset when one owns it) have a strong affective base. This is displeasure, the negative emotion of losing or of depriving oneself of an asset which conditions the value function, increasing the utility of the asset itself.

Another effect of affect on judgement is linked to the relationship between risk and utility. Generally speaking, in economic theory there is a direct link between the two variables: the more a choice embodies risks, the greater the apparent utility of the outcome. On financial markets, the riskier the share, the greater the premium paid as a result; we can think of the bonds of risky countries like Argentina and Greece compared to those of Germany and the United States. Obviously in everyday life, reality is often different. There are large risks that have no utility, except that of

or in two type of processes (Viale, under review). The mind seems to be better represented by a unified model, that is by a single account of mental processes. The two main anti-dualistic approaches are that of the “cognitive continuum” put forward by Hammond (1996), Cleeremans and Jimenez (2002) and Osman (2004) and the “rule-based processing unified theory of decision making” argued by Kruglanski and Gigerenzer (2011). In this chapter my use of System 1 and 2 language is instrumental to describe the mental phenomena that are responsible for biases and errors according to mainstream behavioural economics.

having run them. I can walk for no reason on the cornice outside my flat on the twentieth floor just to show everyone how brave I am. Or I can drive at top speed when I am drunk just to entertain my friends. In these cases large risks are associated with low utility. In fact, at a psychological level, we tend to apply a trade-off between risk and affective evaluation. For example, when we positively value a share for its past history, for the company's good communicative image, for its pleasant managing director and so on, we are attributing a low risk of negative outcomes to it. Take the effect on investors of adding ".com" to the name of shares, at the peak of the Internet bubble, between June 1998 and July 1999. In a study undertaken a few years ago (Cooper et al., 2001) out of 95 shares analysed, the "dotcom effect" caused their value to increase by an average of 74 per cent in the 10 days following the announcement of the name change. Financial bubbles seem to owe a great deal to the value of the affect component in judgement.

The affect component is crucial in the representativeness and availability heuristics, and the emotional salience of an example is the basis for the generalization for an entire category. The error of extrapolation made by investors, when they tend to consider that the past performance of a share is representative of its future performance, is typical. And the emotionally more salient events are those recalled most easily at a mnemonic level. According to many authors, it is thanks to this mechanism that in periods of expansion many financial institutions relax the risk standards and make gross forecasting errors. As Galbraith said in 1954, it is our mnemonic skills that make us forget past crises and only remember present successes, which takes us gradually towards a new crisis. *Prototype heuristics* (Kahneman, 2003) have been developed recently to introduce emotional salience into various types of judgement. For example, various experiments carried out in the past have shown that it is the emotional accessibility of a prototype (for example, a share in a sector that has enjoyed strong growth on the Stock Market, promoted in all the media) that determines the judgement of the entire category (for example a growth forecast for the entire sector).

There is another way that the so-called System 1 of the mind affects judgement. If we go back to the initial example of *The Economist*, it does not seem that the quantity of data and analyses is a guarantee of analytical and forecasting success. Often too many data reduce our capacity to judge. As Gigerenzer underlined successfully (2007), intuitive, gut feelings are often better than elaborately structured judgements. The less-is-more principle is the compass in uncertain environments. In tasks characterized by uncertainty various simple and frugal heuristics give better decision-making results than those achieved with the algorithms of economic rationality (Gigerenzer et al., 1999).

And finally, affectivity comes into play not only at the judgement stage,

but also at the downstream stage of decision-making and action. As neuroeconomics has shown (Camerer et al., 2005), affective components, conveyed by cortical and subcortical structures like the amygdala or the insula, underpin risk behaviour and the perception of trust in one's own actions and those of others.

3. INSIDE THE HUMAN BRAIN

Early in the 1990s, Giacomo Rizzolatti and his colleagues in a neuroscience laboratory at Parma University made a revolutionary discovery which many scientists claim was as important for our understanding of the brain as DNA was for the cell. They identified the “mirror neuron”, a particular type of motor neuron of the brain that has a dual function, being responsible both for our actions and for our understanding of other people's actions (Rizzolatti et al., 2001). The discovery is a classic case of serendipity (a term coined by British diplomat Horace Walpole in 1754, who referred to a Persian fairy tale in which three princes from the kingdom of Serendip – the Arab name for Sri Lanka – made unexpected and lucky discoveries). In the laboratory where Rizzolatti's group were studying the motor neurons of macaque monkeys, there were some peanuts:

Sometimes the monkeys used them to perform tasks, and at other times they were the reward for a task performed with another object. But everyone liked the peanuts, not only the primates. And at a certain point, between recordings, someone watching the experiments “stole” some from the container prepared for the animals. When one of these “thefts” occurred, just as the researcher on duty was putting a handful of nuts into his mouth, the oscilloscope recording the monkey's neuron activity let out a very strange tac-tac-tac sound. The monkey had stopped and was not interacting with any other object. (Rizzolatti and Voza, 2008, pp. 30–31)

The very neurons that were activated when the macaque took the peanuts were stimulated when the monkey saw the researcher do the same thing. These neurons have the ability to be activated to reflect the actions of others, as well as permitting our own.

This is an important discovery. For the first time we understand the brain mechanisms that allow the individual to understand the behaviour of others. In experiments also carried out successfully on humans, it has been shown that, to understand someone else's action, when we observe it, it needs to be reproduced by the network of neurons that is active when we perform the same action ourselves. The amazing fact is that mirror neurons are differentiated for the purpose of the action taken. Neurons that

are activated when we grasp something are different from those excited when we hold or drop or tear something, and so on.

The gradual opening of the black box of the brain will provide more surprises that will help to change the old concepts of human science. Neuroeconomic research is changing the way economic research is performed. First of all, it is a powerful aid to cognitive and experimental research into decision-making models and economic action. Secondly, it poses new problems and issues, like those of the prevalence of automatic affective processes, which will profoundly change the same economic concepts. One example of the overpowering force of neuroscience, which digresses a little but is particularly intriguing, is the redefinition of the concept of free will in the light of some data obtained from EEG recordings of brain activity. As we know, free will is a theological expression, introduced by St Augustine in the fifth century and the subject of his bitter disputes with Pelagius and subsequently of the violent clashes between Luther and Erasmus in the sixteenth and seventeenth centuries. It basically represents the freedom of choice and human will. There are very well articulated philosophical arguments that develop and define the concept. One of these is the deterministic argument, which starts from the assumption that every event in nature is determined by its causal precedents and that it is therefore impossible for human choice not to follow the same rule. This negative vision is questioned not only by great philosophers like Kant, but also by our common psychological experience. At the moment that we choose, we have the feeling that nothing has prompted our choice. It seems that there is an infinitesimal moment that generates our decision, but that it is not caused by anything at all. Neuroscience seems to explain this sensation today with a structural characteristic of the human brain, the cognitive inaccessibility of much of its activity. The brain works and produces psychic activity and we do not realize it. For example, through research with EEG, it has been demonstrated (Libet, 1985) that the moment when we have a feeling that we are about to take a decision is preceded by 300 milliseconds by the wave of brain activity associated with that decision. After another 200 milliseconds from the moment in which we feel that we are about to decide, the behavioural response manifests itself. So the brain has already started to act before we have the sensation that we want to act. Because this brain activity is not accessible to us on a cognitive level, we have the feeling that we have decided freely, that no cause has preceded our decision, but that is not the case. What is more, this sensation of free will is reinforced by the awareness that our previous decision has produced our subsequent behaviour. The issue is a complex one and there could be many objections: for example, that free will anticipates the first wave of brain activity. This is not the time or place to go

into this problem in detail. What I wanted to underline is the impact that neuroscientific studies have on problems that are apparently a long way from the goals of neuroscience.

4. THE EMERGING TOPIC OF FINANCIAL ORGANIZATIONS

Until recently the main field of behavioural finance was the financial market and consumer behaviour. Few studies were done about financial organizations and institutions. In contrast, nowadays, according to Thaler (1999), the emergent topic is behavioural financial organization and in particular behavioural corporate finance and banking (Sheffrin, 2005). Financial policy makers need to understand better the behaviour of financial organizations in order to establish sound financial regulations and policy. Important questions should be answered: what are the decision-making processes of bankers? What kind of rationality do they use? What are their institutional constraints, that is, the bundle of cognitive features, beliefs, mental models, routines and heuristics? One way to deal with this new emerging field is to rely on the tools of mainstream behavioural economics and in particular with Heuristics and Biases programmes. An alternative preferred way is to follow the Simonian tradition of science of administration (March and Simon, 1958) and the post-Schumpeterian tradition of the theory of the firm (for example Dosi et al., 2017), empowered by the new programme of ecological rationality and simple heuristics (Artinger et al., 2014; Loock and Hinnen, 2015).⁸ The study of simple heuristics took place mainly at the individual level or at most “in the wild” (used for example by professional figures or employees in bureaucratic organizations) (Gigerenzer et al., 2011). To date, there has been little empirical analysis of how this type of heuristics can be effective in an organizational context as a bank or a financial institution. In the first place it will be interesting to investigate what kind of heuristics are used at the level of individual organizations and whether there are “local” heuristics, that is, specific and idiosyncratic that depend on the organizational context, or whether there are the same simple general heuristics that are used in different contexts. It is a question of understanding, ultimately, whether or not the same heuris-

⁸ The preference relies mainly on the critique to the normative model of rationality, that of neoclassical economics, used by behavioural economists to assess biases and errors of human decision making. Conversely, under uncertainty only an adaptive and ecological approach to rationality seems to be justified (Berg and Gigerenzer, 2010). Moreover, the main models of behavioural economics seem to be descriptively unsound. In contrast, simple heuristics theory seems to fulfil better the desiderata of a realist theory of decision making.

tics identified at the individual level are valid, in which decision contexts they are rational, and how they relate to the other cognitive and decisional aspects of the organization (Bingham and Eisenhardt, 2011).

Many empirical questions are relevant: are heuristic decisions favoured in the normality of daily management or are they preferred in situations of risk to survival or at least of stress as in the event of a warning about the performance of the company? If the heuristics seem rational at the ecological level in turbulent environments are they also stable? Which portfolio of heuristics defines organizational identity? And can there be a heuristic identity not only at the level of a single company, but at that of industrial sectors? If a new company in emerging markets does not have the time and financial resources for complex analysis and extensive information gathering, can heuristics be the strategic solution to reduce the cost and time of this collection and analysis? In particular, when it comes to predictions and decisions in conditions of ontic or epistemic uncertainty, can heuristics be the solution? Which is the external context in which simple heuristics can assert themselves at the expense of organizational routines?

The more the environment is uncertain, unpredictable and turbulent (as in the case of fin-tech companies or those of investment banking, private equity and venture capital), the greater the possibility that a company finds the use of heuristic decisions profitable (Oliver and Ross, 2005). When simple heuristics are shared, they allow greater coordination (easier to understand each other), improvement in the accuracy/effort ratio (good accuracy with little effort), more ability to improvise in dynamic contexts (given their elasticity), more time saving (in fact they are fast), and more resources for attention (not needing “need for cognition”). Simplicity improves the dissemination and sharing of heuristics. This type of heuristics, especially the one-reason based, may be suitable for semi-structured environments where organizational flexibility is needed because the context is very competitive, dynamic and mutant.

When the external environment becomes turbulent, as in the example of the abrupt variation of the market by new products of competing companies, it seems, therefore, that the principle “less is more” is preferable. In particular, if we analyse the memory of a company,⁹ characterized by beliefs and background knowledge, that is, by cognitive reading keys to categorize external and internal states (Dosi, et al., 2017; Balconi et al., 2007) and by automatic decision-making procedures (routines and

⁹ Organizational memory may be represented by a cognitive and a procedural component. The first includes beliefs, values and cognitive rules to categorize the world: tacit and explicit knowledge. The second includes decision-making procedures (routines, algorithms and heuristics) and skills.

automatic heuristics) and not (aware heuristics and algorithms) its divergent role between stationary and unstable states can be highlighted.

Broadly speaking, in simple and stable environments memory does not matter, provided it satisfies some minimal requirements. In more complex and gradually changing ones, having more memory provides an advantage. However, there is some critical level of environmental instability above which forgetfulness is evolutionarily superior from the point of view of long-term performance. (Dosi et al., 2017)

In sum, when the situation changes radically, and the scenarios become characterized by uncertainty (epistemic or ontic), it seems that it is not advantageous to consume resources of time and calculation to retrieve information from the organizational memory. The information refers to effective action patterns in different market contexts and cannot be a valid basis for decisions in the new competitive context. Therefore it becomes less rational and adaptive to rely on a massive information retrieval from the organizational memory to elaborate complex decisions, while it seems more adaptive to forget part of this “traditional” memory (especially linked to the forms of expert categorization of the external environment), and to base decisions on a small amount of information and to use simple recognition heuristics (such as individual ones of non-experts) or heuristics based on few reasons. The questions to be answered are numerous: in the case of external states, the market in particular, it is important to understand which cognitive tool replaces the previous categorization and how much the choice of this tool is connected to the situation of uncertainty that has emerged. With regard, instead, to the memory of decision procedures, it seems interesting to identify what organizations tend to forget: the routine procedures (in relation to the change in the external environment), the algorithmic ones, or both, since they are no longer adaptive in relation to the situation of uncertainty and to the lack of meaningful information that is required to draw reliable inferences (without the risk of variance). It will then be verified whether these elements of forgetfulness are an element in favour of the financial company’s competitiveness.

5. CONCLUSION: THE BEHAVIOURAL SCIENCES TO BETTER PREDICT AND REGULATE THE FINANCIAL MARKETS AND ORGANIZATIONS

What is surprising after the various financial crises or scandals that have involved several industrial giants, is that they have not taken into consideration the explanations and possible remedies that behavioural

and cognitive economics has for years been proposing to decision-makers to avoid or attenuate these disasters (Bazerman, 2009; Hilton, 2001; Attia and Hilton, 2011). Take the case of the LTCM (Long Term Capital Management), a hedge fund created in 1994 which was increasingly successful until its disastrous collapse in 1998. It adopted “brilliant” models to price shares and measure risks, elaborated by brilliant economists and mathematicians like Fisher Black, Myron Scholes and Robert Merton, who won the Nobel Prize for Economics in 1997 (after Black’s premature death in 1995). In the first two years the fund doubled its capital. It had assets of \$125 billion and off-balance sheet positions of \$1250 billion (the United States budget!). These resources were the result of the uninhibited use of the leverage between indebtedness and capital. While most hedge funds had leverage of 2:1, the LTCM leverage was as high as 50:1 and in some cases 250:1. The entire system was based on supposed risk management that made it possible to establish a given value for the shares and was based on a hypothesis of normality (as if the fluctuations and risks followed a Gaussian curve). For example, it envisaged that the maximum loss in one day could not exceed \$35 million. We know what happened. The managers were unable to correct the estimates, even if since 1997 they had seen many signs of anomalous turbulence on the Asian and South American markets. At the peak of the Russian crisis, daily losses amounted to \$553 million, which forced the Fed to intervene to bail it out. Various emotive and cognitive components, as well as the adoption of an incorrect model, allowed a predicted disaster to occur: hyper security and pathological risk propensity; egocentricity and organizational narcissism; the illusion of control and a confirmation bias; conformism to the flock effect. What is surprising is that the same formula that brought disaster in the case of LTCM – also known as the Black–Scholes case – remained popular until it finally contributed to the great crisis of 2008!

The LTCM disaster highlights a whole range of problems that were later responsible for the 2008 crisis. Some of them are related to the organizational and social *dyscrasia* that underpins risk evaluation and management in financial organizations. Two are particularly important. First of all, at an organizational level, risk managers are actually subordinate to traders. A company’s purpose is to make deals, so if we are talking of risks, it tends to undervalue them and to take them. When a deal is presented, social pressure inside the company tries to communicate the positive aspects and opportunities, and to minimize the risks. So risk managers are seen as disturbances, something that often leads them to adopt attitudes that are not critical but conventional. And secondly, there is a cultural subservience to the rating agencies (which continues today). Their forecasts are considered oracles and represent a conscious or unconscious anchorage for a company’s internal

assessments. It is a shame that, as numerous cases show, they often make dreadful errors of judgement, and there is a serious problem of a conflict of interest between companies to be rated and rating agencies. How can we think that an agency rating can be objective if the company is paying and might not renew the contract the following year, if the agency often provides organizational consultancy inside the company itself, and if there is often an exchange of personnel between the agency and the company?

Many of the problems of social behaviour in the financial field could be neutralized, at least in part, by standards, rules and laws that induce the saver or finance operator to take care to avoid situations in which it is easy to make errors of judgement. The libertarian paternalism of Thaler and Sunstein (2008) tends to gently “NUDGE” the individual to protect his interests better and to prevent institutional mechanisms, like those of the rating agencies, from damaging the saver.¹⁰ How can this be done? A few examples: we can help the individual to grasp the difference between real utility and perceived utility, by forcing him to consider, as in the case of some mortgage agreements in France, what he would have to pay if interest rates were to rise in future while the value of the property falls; we forbid mortgages with rates like those of hybrid American “2–28” and “3–27” mortgages (behind the subprime mortgages crisis), which trap borrowers with a very low initial rate, known as a “teaser”, which then rises over the years; we do not allow conflicts of interest between rating agencies and companies, forbidding consultancy contracts with the same company being renewed more than once; we combat misleading advertising and make contract information cognitively and emotively “friendly”; starting at school, we systematically provide a financial education based on knowledge of behavioural and cognitive finance, introducing the techniques of “debiasing” and metacognitive control of our judgement and decision-making processes.¹¹

In summary, what characterizes a behavioural approach to financial consumer policy and regulation should focus on the following general points (Petroni et al., 2015):

- Simplicity: the complexity of the banking and financial products is such that it renders them dull to the point that the choice made by

¹⁰ This is not the place to analyse the nudge theory critically. Many are the negative remarks to be made about the manipulative side of the theory, in particular to the default states (Viale, 2018). In any case, this theory also contains positive aspects when it supports the empowering of individual autonomy in decision making.

¹¹ Financial education should not be based only on financial literacy. There are many data that show the low impact of financial literacy programmes in improving the financial skill of people. Only by adding risk literacy and behavioural finance training will the individual skill be really improved in financial decision making.

the consumer cannot often correctly represent the critical variables in play.

- Linguistic transparency: the use of a cryptic technical language and in particular of a formal language based on conditional probabilities and not on natural frequencies does not ease the understanding of risks.
- Salience: in the presentation of a product one should diversify the relative importance of the variables by increasing or decreasing their perceptual salience.
- Mapping: banking and financial products are not articulated in a way to promote the convergence between expected subjective utility and actual future reality. Namely, the mapping function between contingent choices and future well-being is missing. With the increased risk of traps and teasers.
- Disclosure: during disclosure, procedures should take into account and discount the psychological distorting effects on behaviour of the financial advisor (for example, moral licence to be less moral) and the person receiving the advice (burden of disclosure) (Sah et al., 2013).

To conclude, an emerging field in economics is that of behavioural finance. It is the result of the collection of many kinds of data coming from experimental, behavioural, cognitive economics and neuroeconomics. Financial behaviour is relatively easily studied in natural settings and artificial experiments. The results of these studies allow the control of hypotheses in cognitive economics and the generation of new insights in economic behaviour.

Observations of behaviour have moved social scientist inquiries from modelling decision-making based on an ideal agent to incorporating emotions and accounting for heuristics. This endeavour is further empowered by advances that allow access inside the human brain. These insights and findings can be formulated to inform financial policymaking towards achieving more stability, establishing sustainable security for the people and empowering the financial consumers.

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