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Some Problems of Behavioral Economics

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Abstract:

Purpose: *The objective of this paper is to examine five problems related to the behavioral economics.*
Design/Methodology/Approach: *Logical reasoning based on relevant literature.*
Findings: *Behavioral economics suffers from a few shortcomings that put the contribution of this research subfield into economics in question. First, it claims that people are not rational and that this discredits neoclassical economics, which is based on the homo economicus model. However, behavioral economics wrongly interprets homo economicus as a psychological model instead of an analytical device. Second, despite criticizing homo economicus as an inaccurate depiction of human behavior in the real world, behavioral economics wrongly adopts it as a normative standard. Third, it confuses individual (constructivist) with systemic (ecological) rationality, thus committing the fallacy of composition. Fourth, behavioral economics erroneously considers people's irrationality as an argument for government interventions. Fifth, their research agenda leads behavioral economists to see biases even where there are none.*
Practical Implications: *Policies based on behavioral economics might be not adequate.*
Originality/value: *Thorough the examination of few important shortcomings of the behavioral economics neglected in the literature.*

Keywords: *Behavioral economics, biases, homo economicus, rationality.*

JEL classification: *B4, D9, E7, G4.*

Paper Type: *Reading essay.*

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1. Introduction

Behavioral economics is becoming more and more popular. After Daniel Kahneman in 2002 received the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for integrating insights from psychological research into economic science, another representative of this school of thought, Richard Thaler, joined the group of laureates in 2017 for his own contributions to behavioral economics. What is behavioral economics? Briefly, it is a research program that aims to replace the homo economicus model with a more psychologically informed view of human decision making. It argues that people do not maximize their utility by relying on logical reasoning but make decisions based on heuristics that lead to errors (Kahneman and Tversky, 2000). Behavioral economics aims to construct a psychologically realistic depiction of human behavior, replacing homo economicus with real people with bounded rationality, bounded willpower, and bounded self-interest (Jolls, Sunstein, and Thaler 1998; Mullainathan and Thaler, 2000; Thaler, 2015).

I argue that although behavioral economics may offer psychological insights, its importance for economics is more limited than it is commonly believed. It is true that in real life, people do not behave as depicted in the homo economicus model. But this does not justify the theoretical and political conclusions drawn by behavioral economists.

Section 2 examines the homo economicus model and how behavioral economics wrongly interprets it as a psychological model instead of an analytical device or economic approach. Section 3 shows that the notion of rationality might be understood differently and that the notion adopted by behavioral economics is too narrow and not adequate. It argues that behavioral economics' use of homo economicus as a normative standard, despite its criticism of the model as an inaccurate depiction of human behavior in the real world, is the field's cardinal flaw. Section 4 distinguishes individual (constructivist) from systemic (ecological) rationality and shows that behavioral economics confuses these two concepts. Section 5 demonstrates that even if we assume that people are not rational, that does not constitute an argument for government intervention. On the contrary, we need markets to maintain a rational system. Section 6 argues that behavioral economists can also be prone to cognitive errors. Section 7 concludes.

2. Behavioral Economics' Contribution to Economics Is Limited

Behavioral economics aims to provide more realistic conceptions of economic agents by opposing the homo economicus model and replacing "Econs with *Homo sapiens*, otherwise known as Humans" (Thaler, 2016, 1578). The problem here is that economists have always been aware that human behavior in the real world is not identical to that of homo economicus. To claim otherwise is to attack a straw man. John Stuart Mill (1844), considered a creator of that model, introduced it to make economics into a science, not because he believed individuals behave like homo

economicus: "The science then proceeds to investigate the laws which govern these several operations, under the supposition that man is a being who is determined, by the necessity of his nature, to prefer a greater portion of wealth to a smaller in all cases . . . Not that any political economist was ever so absurd as to suppose that mankind are really thus constituted, but because this is the mode in which science must necessarily proceed."

Indeed, homo economicus was never intended to be a realistic psychological depiction of human behavior. Rather, as Becker (1993, 1, emphasis in original) states, the economic approach based on rational choice "is a *method* of analysis, not an assumption about particular motivations." Homo economicus is an analytical device or a theoretical construct created to make predictions about *market behavior* (Rizzo, 2017). So, it is incorrect to claim that economists and psychologists study different species—while psychologists develop theories of human motivations and behaviors, economists do not. Economists treat preferences as given and are more interested in the effects of human interaction on markets.

What behavioral economists fail to grasp is that the analytical description of a process is not the same thing as the actual process. As Machlup (1946, 535) puts it, "The explanation of an action must often include steps of reasoning which the acting individual himself does not consciously perform (because the action has become routine) and which perhaps he would never be able to perform in scientific exactness (because such exactness is not necessary in everyday life). To call, on these grounds, the theory 'invalid,' 'unrealistic' or 'inapplicable' is to reveal failure to understand the basic methodological constitution of most social sciences." Economists do not believe that people make rational decisions as depicted by the homo economicus model. Rather, they consider the implications of observed choices *as if* the people making the choices were rational (Machlup, 1946; Friedman and Savage, 1948; Friedman, 1953). Even though economic agents do not decide like homo economicus, the model accurately describes the behavior of the whole economic system. It aims to describe the selection process that operates in the market and leads to the aggregate outcome, not the individual behavior. It does not assert that market participants behave like homo economicus, but only that the market functions as if they do.

Economists say that economic agents behave as if they act like homo economicus, because only such entities could survive in the long run. For example, companies that act "irrationally" and incur losses drop out of the market (Obregón, 2018). In other words, reality or physical constraints do not allow for continuously or systematically irrational behavior. So, even "irrational" agents would tend to respond "rationally" to a change in prices in order to remain in the market. As Becker notes (1976, 164), "The decisions of irrational firms are limited by a budgetary constraint."

Hence economic analysis does not depend on rational individual behavior, but on the market as a selective mechanism that chooses among behaviors generated by the adaptive pursuit of utility or profits. As Alchian (1950, 220–221) puts it "The economist, using the present analytical tools developed in the analysis of the firm

under certainty, can predict the more adoptable or viable types of economic interrelationships that will be induced by environmental change even if individuals themselves are unable to ascertain them. That is, although individual participants may not know their cost and revenue situations, the economist can predict the consequences of higher wage rates, taxes, government policy, etc. Like the biologist, the economist predicts the effects of environmental changes on the surviving class of living organisms; the economist need not assume that each participant is aware of, or acts according to, his cost and demand situation".

The key is that economics is a formal science of human action. It means that terms such as "desire for wealth," "pleasure," "self-interest," or "utility" are used by economists in a no psychological way, without reference to their actual content. Hence the homo economicus model abstracts from motives. It can be filled with any empirical content and accommodate any motive or desire.

The formal nature of economics is most emphasized by the Austrian school with its praxeological approach (Mises, 1998), but mainstream economists also have adopted the formal means-ends structure to analyze human action. According to this approach, people simply choose means to their subjective goals; self-interest does not mean that people care only about themselves, but that they try to achieve their own goals, whatever they might be. This approach was already seen in Smith (1977), for whom rationality meant that individuals act freely in their best interest as they perceive it but is commonly associated with Becker (1976). For him, individuals also "maximize welfare *as they conceive it,* whether they be selfish, altruistic, loyal, spiteful, or masochistic" (Becker, 1993, 1, emphasis in original). Similarly, for Posner (1997, 1551), rationality means "choosing the best means to the chooser's ends." This quite common sense and broad definition does not exclude cognitive errors. It also does not imply the model of emotionless, unsocial, selfish humans who constantly maximize utility, as homo economicus is often caricatured by behavioral economists (Maialeh, 2019).

Such economists incorrectly assert that homo economicus is excessively self-interested, as in many real-life situations people have more socially oriented motivations. However, "never in the history of the economic discipline has selfishness constituted the core of the Homo economicus model" (Hudík, 2015, 154). This is because it says nothing about the motives of behavior, so it does not preclude social motives. After all, the existence of preferences and the content of preferences are distinct things (Blume and Easley, 2008). As Robbins (1932, 87) notes

> the fundamental concept of economic analysis is the idea of scales of relative valuations; and, as we have seen, while we assume that different goods have different values at different margins, we do not regard it as part of our problem to explain why these particular valuations exist. We take them as given data. So far as we are concerned, our economic subjects can be pure egoists, pure altruists, pure ascetics, pure sensualists or—what is much more likely—mixed bundles of all these impulses. The scales of relative valuation are merely a convenient formal

> way of exhibiting certain permanent characteristics of man as he is. Failure to recognize the primacy of these valuations is simply a failure to understand the significance of the last sixty years of Economic Science.

In other words, in the homo economicus model, people maximize utility, but the source of this utility is not specified or does not have to be narrowly specified. It may include not only goods and services, but also altruism, commitments, emotions, fairness, racism, strategic behavior, virtues, and more. Classical economists already noticed that economic motives could include altruism (Machlup, 1978b), while Becker (1976b) formalized that fact.

That general view of individuals as purposeful beings who set goals, evaluate the means to achieve the goals, and constantly adapt to their changing opportunity sets is the reason for the relative success of homo economicus as the building block not only of economics but of the social sciences in general, especially when compared to homo sociologicus or homo psychologicus (Jensen and Meckling, 1994).

The above points should make it clear why I claim that behavioral economics' contribution to economics is limited, and that it poses no challenge for the homo economicus model. It provides us with a psychological description of individual behavior—perhaps more realistic than before, but not necessarily. But economics abstracts from mental processes. Economists make no claims about people's feelings, preferences, goals, or motivations. The homo economicus model was constructed to portray some aspects of the pure logic of human action, not human nature as behavioral economists see it. The homo economicus model was not designed for interpreting people's action, but for interpreting their observed consequences (Machlup, 1978a). In other words,

> *homo oeconomicus* is the metaphoric or figurative expression for a proposition used as premise in the hypothetico-deductive system of economic theory . . . It is probably agreed that *homo oeconomicus* is not supposed to be a real man, but rather a man-made man, an artificial device for use in economic theorizing. Thus, he is not a *homo* but a *homunculus.* It is *homunculus oeconomicus* we have been talking about all along (Machlup 1978b, 297-298).

The whole point of the homo economicus model is not to provide a theory of true behavior, but to sidestep the need for one. Analyzing action in terms of the true cognitive processes rather than the abstract model of homo economicus is naïve, as various mental procedures, judgments, and heuristics are very situation-specific and can hardly be expressed in general terms, which is what theory, in contrast to mere description, requires (Schlicht, 1990).

Another problem with analyzing mental processes is that they are not readily knowable. So, it is impossible to determine with certainty whether an individual has behaved rationally or irrationally because we do not know the true, underlying motives, and allegedly irrational choices can be always reinterpreted as rational if we

learn more about people's motivations. Hence, we should distinguish the social world in which we live and the social world that is the object of scientific observation. As Schuetz (1943, 132) notes, "We should certainly be surprised if we found a cartographer in mapping a town restricting himself to collecting information from natives."

I must agree with Thaler (2016, 1577), who notes that "the methodology of behavioral economics returns economic thinking to the way it began." However, this is not a reason for glory, but for discomfort, as behavioral economics sets back economics by several hundred years. Indeed, the attacks of behavioral economics on homo economicus resemble the old criticism of economics by the historical school. As Kirzner (1976, 167) notes

> the concept of rationality in human behavior has long been a topic for discussion in the literature on the methodology of economics. Attacks on the undue reliance which economic theory has been accused of placing upon human reason are as old as attacks on the very notion of an economic theory. Historically minded critics of theory long ago discovered that man is possessed of "instincts," that he is a creature of "habit," that he is capable of being carried away by mass hysteria and other psychological aberrations. Economic theory, it was found, had blindly ignored the realities of life. Where it had not explicitly endowed economic man with an exclusive thirst for "wealth" or with an utterly selfish character, economics had apparently proceeded on the quite gratuitous assumption that men behave sensibly from the point of view of their own interests. It was easy to demonstrate how far from the truth economics must be; it was easy to point out the true character of men with their full array of impulses, instincts, and stupidities.

To be clear, I do not claim that psychologic reasoning is useless. Nor do I believe that behavioral economics does not offer valuable insights. My point is that it adds little to economic theory. It has not demonstrated that homo economicus is false, as homo economicus is not a description or theory of individual behavior, but a useful analytical approach to human action. As Friedman (1953, 34) points out

> The confusion between descriptive accuracy and analytical relevance has led not only to criticisms of economic theory on largely irrelevant grounds but also to misunderstanding of economic theory and misdirection of efforts to repair supposed defects. "Ideal types" in the abstract model developed by economic theorists have been regarded as strictly descriptive categories intended to correspond directly and fully to entities in the real world independently of the purpose for which the model is being used. The obvious discrepancies have led to necessarily unsuccessful attempts to construct theories on the basis of categories intended to be fully descriptive.

Hence, even if people behaved irrationally, the homo economicus model would maintain its analytical relevance. For example, it is true that some people fear flying, which may seem to be odd, given the low probability of dying in an airplane crash.

Even if we agree that the fear is irrational (although it may not be the case from the evolutionary perspective and given uncertainty regarding the safety of different modes of transportation), it does not invalidate the economic analysis of demand for air transport. As Posner (1997, 1554) notes, "A preference can be taken as a given, and economic analysis proceed as usual, even if the preference is irrational." Nor does behavioral economics say anything about the functioning of the whole economic system, as the aggregate outcomes are different from the intentions and capacities of the individual agents. Hence, even if people behave irrationally, the aggregate outcome may be still in line with rational choice theory—not only because the irrational actions may be randomly distributed around the mean of rational reactions, but also, or even primarily, because the market, which is an adoptive system, selects rational behaviors.

Behavioral economics does not provide any alternative to rational choice theory that could explain and predict human decision making and action. All that behavioral economics has is a hostile stance toward neoclassical economics. It just provides the negative of the homo economicus model, in the sense that it focuses on phenomena allegedly unexplained by homo economicus. Instead of explaining the seemingly atypical outcomes, it simply assumes that people are irrational. It is not only a non-empathic and arrogant approach to observed human behavior, but also not scientifically fruitful, as calling the behavior irrational does not increase our understanding of this behavior.

However, if people are not rational—that is, they do not want to fulfill their goals by adopting the best available means—their behavior follows no rules. They can do anything. In other words, without the rationality principle we would not be able to build economic theory. And without theory we have merely descriptive material (Coase, 1984).

The concept of rational action is a chief principle of the method of all social sciences (Weber, 1978). As Schuetz (1943, 147-148) points out,

> The ideal type of social action must be constructed in such a way that the actor in the living world would perform the typified act if he had a clear and distinct scientific knowledge of all the elements relevant to his choice and the constant tendency to choose the most appropriate means for the realisation of the most appropriate end. Indeed, as we had anticipated in the beginning, only by the introduction of the key concept of rationality can all the elements be provided for the constitution of the level called "pure theory".

The postulate of rationality implies, furthermore, that all other behaviour must be interpreted as derivative from the basic scheme of rational acting. The reason for this is that only action within the framework of rational categories can be scientifically discussed. Science does not have at its disposal other methods than rational ones and it cannot, therefore, verify or falsify purely occasional propositions.

3. Rationality Does Not Have to Mean Logical Consistency

Somewhat paradoxically, behavioral economists criticize the concept of economic man as an incorrect description of human behavior, yet they endorse it as a normative standard. In this section, I argue that this is the key problem of behavioral economics. I abstract from the logical problems related to accepting homo economicus as the benchmark for rational behavior despite mocking it as a plainly wrong description of reality. Instead, I focus on showing why homo economicus should not be used as a normative standard for rational behavior.

The first major problem is that comparing real individuals' behavior with any standard violates the principle of subjectivism in economics. Economics should treat people's goals as given and treat alike, without making any value judgments about them. As Mises (1998, 21) puts it,

> The teachings of praxeology and economics are valid for every human action without regard to its underlying motives, causes, and goals. The ultimate judgments of value and the ultimate ends of human action are given for any kind of scientific inquiry; they are not open to any further analysis. Praxeology deals with the ways and means chosen for the attainment of such ultimate ends. Its object is means, not ends.
> In this sense we speak of the subjectivism of the general science of human action. It takes the ultimate ends chosen by acting man as data, it is entirely neutral regarding them, and it refrains from passing any value judgments. The only standard which it applies is whether the means chosen are fit for the attainment of the ends aimed at. If Eudaemonism says happiness, if Utilitarianism and economics say utility, we must interpret these terms in a subjectivistic way as that which acting man aims at because it is desirable in his eyes.

The second fundamental problem with the debate about rationality in economics is that there are several definitions of rationality and many researchers, including behavioral economists, confuse them or choose an inadequate one. The concept of rationality present in the homo economicus model, although useful in some contexts, is inapplicable to human action in the real world.

Evans *et al.* (1993, 168) distinguish two distinct but implicit definitions of rationality:

- rationality_1, (rationality of purpose): reasoning in a way which helps one to achieve one's goals;
- rationality_2, (rationality of process): reasoning in a way which conforms to a supposedly appropriate normative system such as formal logic.

Behavioral economists equate rationality_1 with rationality_2 (also called Cartesian rationality). That is, they either believe that rationality is the same as logicality (or deductive competence) or assume that rationality_2 serves rationality_1. They allegedly have demonstrated that people are not fully rational in the second sense. However, as

Evans *et al.* (1993, 170) point out, this does not prove that people are irrational in the first sense, as "real-life reasoning is not, in general, well modelled by laboratory reasoning tasks. In everyday life we do not reason in order to be logical but are logical (when we are) in order to achieve our goals."

In other words, ensuring internal logical coherence of judgments is not the same as making useful, reasonable choices in the real world (Gigerenzer and Todd, 2002). As Schuetz (1943, 140) notes, "We do not make every-day propositions with the purpose of achieving a formal validity within a certain realm which could be recognised by someone else, as the logician does, but in order to gain knowledge valid only for ourselves and to further our practical aims. To this extent, but only to this extent, the principle of pragmatism is incontestably well founded. It is a description of the style of every-day thought, but not a theory of cognition." Indeed, what matters is not logical consistency, but making a sound decision that increases the chance of success—for example, for patients who have to choose their treatment method, the chance of healing. As Gigerenzer (2018) puts it, "At issue is not that people make errors—we all do—but whether these statistical or logical principles are actually sensible norms of behavior, which would qualify deviations as mental illusions."

The problem with rationality of process is that it consists in logical deduction from explicit premises. People are rational when they obey certain axioms of logical behavior and have the capacity to determine the optimal choice. As the problems are well defined, individuals simply deduce conclusions from given premises. However, in practically all economic situations the requirements for successful deduction are not met, as either computations are too demanding or the relevant data (such as the probabilities or the payouts in all possible scenarios) are not known. In an open-ended world, the means-ends framework is not given to people. So, they have neither full knowledge of the problems they face nor the ability to optimally solve them. Individuals also do not know what other people know and how they would behave in response to their actions.

Hence the process of decision making looks different in the real world. As Arthur (1992) argues, beyond the complexity boundary (when problems become ill defined), people must use inductive reasoning and to learn what goals are worth pursuing and how to achieve them. In such a world, human action cannot be explained by Cartesian rationality, which refers to the optimal choice of means to satisfy given ends (Langlois 1985). This is why Hayek (1967, 84) opposes such a notion, turning to a long and well-developed tradition in which "reason had meant mainly a capacity to recognize truth . . . when they met it, rather than a capacity of deductive reasoning from explicit premisses."

Hayek considers Cartesian rationality as the capacity of the mind to arrive at the truth by a deductive process from a few obvious and undoubtable premises as naïve rationalism or rationalist constructivism. According to him, this notion

> implies the claim that man's intelligence is adequate to order his life successfully

> without availing himself of the aid which general rules or principles can give him, in other words, claim that man is capable of co-ordinating his activities successfully through a full explicit evaluation of the consequences of all possible alternatives of action, and in full knowledge of all circumstances. This, of course, involves not only a colossal presumption concerning our intellectual powers, but also a misconception of the kind of world in which we live. It treats our practical problems as if we knew all the facts and the task of coping with them were a purely intellectual one. I am afraid much of modern social theory also has been deprived of value by this same assumption. The crucial fact of our lives is that we are *not* omniscient, that we have from moment to moment to adjust ourselves to new facts which we have not known before, and that we can therefore not order our lives according to a preconceived detailed plan in which every particular action is beforehand rationally adjusted to every other (Hayek 1967, 90, emphasis in original).

Hence, given that ought implies can and that the standard of behavior should be realistic, rationality of process should not be the normative standard of human action, as it does not apply to the real problems people face in daily life and as it requires a level of rationality not available to human beings. But the fact that people cannot calculate the probability of a certain event or cannot calculate the best combination of moves during a chess game does not mean that they are irrational, as close-ended and open-ended problems are categorically different. As King (2016, 131-134) notes,

> in a world of radical uncertainty, where it is not possible to compute the "expected utility" of an action, there is no such thing as optimizing behaviour. The fundamental point about radical uncertainty is that if we do not know what the future might hold, we don't know, and there is no point pretending otherwise . . . The language of optimisation is seductive. But humans do not optimize, they cope. They respond and adapt to new surroundings, new stimuli and new challenges. The concept of coping behaviour does not, however, mean that people are irrational. On the contrary, coping is an entirely rational response to the recognition that the world is uncertain. There is no need to abandon the conventional assumptions of economists that people prefer more consumption, or profit, to less, and that their choices display a degree of consistency. The strength of economics as a social science is the belief that people will attempt to behave rationally. The challenge is to work out how a rational person might cope with radical uncertainty. People are not dumb. It is just that in a world of radical uncertainty even smart people do not find it easy to know what it means to behave in a smart manner . . . Individuals are not compelled to be driven by impulses, but nor are they living in a world for which there is a single optimizing solution to each problem. If we do not know how the world works, there is no unique right answer, only a problem of coping with the unknown.

Hence heuristics should be seen not as deviations from rationality, but rational tools to cope with the uncertain future and open-ended problems that hardly resemble the close-ended, logical puzzles that research subjects solve during behavioral

experiments. In other words, what appears to be (ir)rational under risk is not always (ir)rational under certainty. Induction is thus perfectly reasonable behavior in an open-ended world, where means-ends frameworks are not given to individuals; and heuristics and emotions help people to act reasonably (in line with rationality of purpose) when Cartesian rationality alone is insufficient (Simon 1957; Gigerenzer, Todd, ABC Group, 2002).

Moreover, given limited cognitive capacity, reducing our mental effort might be rational—after all, the mind is humans' most valuable tool. Committing judgment errors from time to time, particularly when making decisions about abstract choices, can be a small price for automating most of our activities – especially since, in general, or at least in routine situations, it works correctly. As Smith (2008, 32) notes, "If it were otherwise, no one could get through the day under the burden of the self-conscious monitoring and planning of every trivial action in detail."

It seems that behavioral economists' erroneous focus on rationality of process stems from their perception of economics as a theory of decision making rather than a theory of action (Huerta de Soto, 1998). The process of deciding implicitly assumes a close-ended problem. That is, it assumes that decision makers already possess knowledge of ends and means and that they only have to choose the optimal means to achieve the chosen ends. Meanwhile, the theory of human action covers not only the concept of individual decision making, but the concepts of seeking new ends and means, learning from the past, and coping with the uncertain future.

Decisions are irrelevant for economics until they are expressed in action. Only action reveals an individual's preferences. Decisions not backed by action are just wishful thinking. Therefore, one should distinguish between rationality of decision making (or thinking) and rationality of actions and why economists are not interested in the decision-making process. For them, it does not matter whether an individual came to the decision of buying car by careful, systematic, and logical analysis with the aid of a spreadsheet, by spontaneous whims, by collective brainstorming, or by tossing a coin. What really matters at the end of the day is that a person acted in a particular way – that is, she purchased a car.

Another problem with the notion of rationality adopted by behavioral economics is that it repeats Descartes's error. That is, it wrongly assumes the separation of mind and body and of rationality and the emotions that allegedly impair our ability to act rationally. As Damasio (1994) shows, people with impaired emotionality are not able to make rational decisions in their personal and professional lives, although they can solve logical puzzles. Hence, emotional development is required to make rational decisions, which implies that the notion of rationality as cool, emotionless reasoning is completely wrong. Our minds integrate both emotions and reason. This calls into question Kahneman's thesis that there is a dichotomy between two modes of thought, the instinctive and the logical (Kahneman, 2011). In the real world, the problems people face are open-ended and there might be no single fully rational solution. In such cases, emotions prompt people to go in a direction that is better than that resulting

from a random choice or endless calculations (Johnson-Laird and Oatley, 1992). They also enable social cooperation and rational commitments (Posner, 1997, 1565).

Finally, the fact that people are not fully rational in the Cartesian sense does not mean that they behave irrationally from the evolutionary perspective. Many decisions or actions that behavioral economists label as irrational cease to seem so when one turns to evolutionary biology. What is evolutionary rationality? To be evolutionarily rational, an action should promote evolutionary survivability, or it should not impair it at least. According to Winter (2014, xvii), "An action undertaken by an individual is rational if, given the prevailing conditions at the time the action is chosen, there does not exist another action that will give the individual a greater evolutionary advantage."

Hence "evolutionary rationality is a higher-order rationality that encompasses rational and irrational behavior, as these have been traditionally defined" (Herrmann-Pillath, 1994). Perhaps the best example of behavior that is irrational according to behavioral economists that can be considered as rational from the evolutionary point of view is altruism (or fairness). After all, altruism promotes inclusive fitness, "defined as maximizing the number of copies of one's genes by maximizing the number of creatures carrying them, weighted by the closeness of the relation" (Posner, 1998, 1561). Moreover, our survival originally depended on social relations, so it was maladaptive to abstract from the real and perceived impact of our behaviors on other people.

Another common example of seemingly irrational behavior found by behavioral economists is that people tend to overestimate the incidence of low-probability events. People are said to miscalculate the risk of terrorist attacks. Kahneman (2011) describes the risk of suicide bombings on buses in Israel from 2001 to 2004. Although the risk of a single passenger being a victim was small, people avoided buses as much as possible, which was irrational and resulted from the availability heuristic. Kahneman (2011) is confusing risk with uncertainty (Knight, 1921), or class probability and case probability (Mises, 1998). The problem is that the concept of measurable risk does not apply here, as past statistics say nothing about future events that are fundamentally uncertain. Facing threats whose probability we cannot estimate, it is simply more rational from the evolutionary point of view to err on the safe side and to overestimate rather than underestimate the possibility of danger.

Hence, if people were as irrational as behavioral economists often think, it would be difficult to explain how our species survived. The actual decision-making environment is more complicated than that assumed by behavioral economists. People owe their existence to their ancestors, who developed the ability to adapt to a changing environment, not to optimal processing of information about static equilibrium conditions and probability distributions.

4. Behavioral Economics Confuses Individual with Systemic Rationality

The next problem with behavioral economics is that it confuses individual with aggregate rationality. As behavioral economists endorse the concept of economic man as a normative standard for rational individual behavior, they must assume, at least implicitly, that if people were to somehow make more rational decisions, then society at large would be better off. However, the idea that individuals have to be rational in order to achieve rational outcomes in the aggregate is a fallacy of composition. People may be irrational (in the sense of rationality of process) and yet markets quite rational.

The observation that for markets to function properly people do not have to be rational, omniscient, good, or intelligent was the starting point of economics as a science. After all, the greatest merit of the philosophers of Scottish Enlightenment was to show that people do not have to be good for their behavior to bring good results (Smith, 1776). Similarly, Hayek (1945) shows that thanks to the process of competition and the price mechanism that together generate and transmit information, individuals need to know little to take the right action. In other words, "markets economize on information, understanding, rationality, numbers of agents, and virtue" (Smith 2008, 325).

Alchian (1950) argues that what really matters for the economy is generating positive profits, not the individual decision-making processes, motivations, or capabilities behind them, and that these profits are achieved by those who are better than the competition, not the most intelligent or the most rational individuals. This means that intelligence or individual rationality does not matter, because even in a society of idiots profits will exist. As Alchian (1950, 213, emphasis added) puts it, "Positive profits accrue to those who are better than their actual competitors, even if the participants are ignorant, intelligent, skillful, etc. The crucial element is one's aggregate position relative to actual competitors, not some hypothetically perfect competitors. As in a race, the award goes to the relatively fastest, even if all the competitors loaf. *Even in a world of stupid men there would still be profits*". Indeed, Gode and Sunder (1993) demonstrate that even if populated by entities with zero intelligence that submit random bids and offers, markets can still effectively work thanks to the appropriate institutional environment.

The key point here is that in addition to individual (constructivist) rationality, there is also systemic (ecological) rationality, which ensures that markets lead to equilibrium regardless of the nature of actions (whether they are rational, nonrational, or irrational) taken by individuals. According to Smith (2008, 2), the former applies "to individuals or organizations, involves the deliberate use of reason to analyze and prescribe actions judged to be better than alternative feasible actions that might be chosen," while the latter refers to "emergent order in the form of the practices, norms, and evolving institutional rules governing action by individuals that are part of our cultural and biological heritage and are created by human interactions, but not by conscious human design."

By now it should be clear that behavioral economics does not really provide a real challenge to the homo economicus model, as it remains within the framework of constructivist rationality, according to which the rationality of the economic system is derived entirely from the rationality of individuals. Behavioral economists believe that markets cannot be fully rational unless entities are fully rational in the sense assumed in the homo economicus model. Hence, they unnecessarily narrow the scope of their research to the behavior of individuals, neglecting coordination occurring in the market that enables allegedly irrational individuals to prosper and drive the economy toward socially beneficial results.

In section 2, I agreed with Thaler (2016, 1577), who noted that "the methodology of behavioral economics returns economic thinking to the way it began." It seems that my agreement was premature as behavioral economics fails to grasp what classical economists already understood – namely, that spontaneous order is possible. A rational economic system and equilibrium market outcomes are not the result of rational human design, but of actions taken by people with different deductive capacities in the right institutional environment.

5. Irrationality of Individuals Is Not an Argument against but in Favor of a Free Market

Another problem of behavioral economics I would like to examine is the nirvana fallacy (Demsetz, 1969). The alleged irrationality of individuals is the justification for governments to nudge them toward socially desirable outcomes. The obvious problem here is the assumption that policy makers behave rationally, but consistency would require behavioral economists to adopt a comparative-institutional approach in which the market outcome with irrational agents is compared to government interventions conducted not by fully rational policy makers, but by policy makers with the same rationality as other human beings. In other words, behavioral economics should drop its naïve view of government officials and adopt the "politics without romance" view (Buchanan, 1984).

Viewed from this perspective, policy makers are prone to the same cognitive errors as other people, which could lead them to implement ineffective measures. For example, Kahneman (2011) describes the planning fallacy, which concerns formulating overly optimistic forecasts about the results of undertaken ventures and which applies not only to households and companies but also to government bodies. Other examples of cognitive errors that policy makers are susceptible to are the following:

- the availability heuristic and the resulting mistaken responses to risk, and a focus on short-term and positive effects of an intervention, such as tariffs, while ignoring its long-term, overall negative economic consequences;
- self-serving bias, which means policy makers believe all positive economic developments occur thanks to the government, while all negative developments result from external shocks despite the government's actions;
- confirmation bias, according to which after the implementation of a given

> policy or intervention, such as the Vietnam War, all subsequent government activity focuses on justifying it while ignoring the unpleasant facts.

Another inconsistency of behavioral economists is that although people are not fully rational in markets – and this is why they should be nudged in the right direction – their irrationality is not a problem for the democratic process. In other words, people allegedly have bounded rationality, but behavioral economists examine its implications only in the market dimension, omitting its effects on voting, even though those effects determine national policies.

I do not want here to argue against democracy; rather, I would like to point out that if behavioral economists want to be consistent, they should acknowledge that voters can also behave irrationally. So even if politicians were rational, we cannot assume voters would be. Indeed, as Caplan (2007) shows, citizens systematically vote for parties and programs that are not necessarily in their long-term economic interest, thus making irrational choices. Caplan distinguishes four main groups of systematic errors: (1) antimarket bias – the tendency to underestimate the economic benefits of the market mechanism; (2) antiforeign bias – the tendency to underestimate the economic benefits of interaction with foreigners; (3) make-work bias – the tendency to underestimate the economic benefits from conserving work; (4) pessimistic bias – the tendency to overestimate the severity of economic problems and underestimate the (recent) past, present, and future performance of the economy.

Since voters have biases, the voting mechanism leads to irrational results that harm society, so we should reduce the scope of political power and expand the scope of the market. The key difference between the voting and market mechanisms is that the latter is based on the profit-and-loss mechanism and agents facing budgetary constraints, while voting costs practically nothing but allows people to gain significant psychological benefits in the form of virtue signaling or expressing their patriotism, concern for the environment, or support for a given group. Hence, in contrast to the marketplace, voting has no built-in mechanisms that motivate one to limit irrationality and behave reasonably.

Bagus and Bañuelos (2018) strengthen the case for limiting the scope of government, as they argue that the modern welfare state is justified based on a cognitive error – namely, people systematically underestimate the tendency of others to help those in need. If people do not believe that others would support the poor to a similar extent to themselves, then they are more likely to agree that the government safety net is needed.

Huemer (2013) goes even further, suggesting that the main reason why people favor governments is that they have strong pro-authority psychological biases or even suffer from Stockholm syndrome. Thus, not only the modern welfare state, but the political authority of the state in general, results from cognitive biases.

So, even if we agree for the sake of discussion that people are not fully rational, this

is not a sufficient argument in favor of greater interventionism, as voters and policy makers could also behave irrationally. The whole idea of libertarian paternalism is based on the belief that bureaucrats and politicians behave more rationally than ordinary people and therefore can nudge others in a socially desirable direction (Thaler and Sunstein, 2008). But behavioral economists do not provide evidence for this claim. Institutional analysis suggests that the political system is less rational than the market system.

Hence the irrationality of individual behavior strengthens the case for the free market for two reasons. First, as I have already pointed out, contrary to the world of politics, there is a self-correcting profit-and-loss mechanism in the market that punishes irrational (ineffective) behavior and rewards rational (effective) behavior. Thanks to this mechanism, market participants can learn which actions were appropriate and which were not and to modify their behavior on an ongoing basis. There is an objective test of the adequacy of one's activities. However, there is no such direct test in the political or bureaucratic sphere, and voters, policy makers, and officials do not bear the full cost of their irrational decisions.

Second, if the economic problem of society were merely the logical problem of how to allocate given resources, where "given" means given to a single mind that deliberately solves the problem, then central planning could work. But this is not the problem society faces, as "the 'data' from which the economic calculus starts are never for the whole society 'given' to a single mind which could work out the implications and can never be so given" (Hayek, 1945, 519). In the real world, the premises needed for logical reasoning are not given, and people face ill-defined problems that go far beyond mere optimization. Agents' rationality is thus not a requirement for markets to work; rather, the market is the tool for individuals to gain relevant knowledge. So, although individuals may have limited cognitive abilities and deductive competence, or actually because of it, the locus of rationality in planning is not the government or a group of experts who hand down prescriptions to citizens, but the "experienced individual agent exercising perceptiveness and insight in the immediate context of action" (Miller 1983, 36). Precisely because people are not logical and because the economic problem of society cannot be solved by pure logic, individuals have to use the market mechanism.

6. Biases in Behavioral Economics

Just as consistency would require behavioral economists to assume that voters and policy makers may also behave irrationally, it would also call for acknowledging that behavioral economists themselves could be prone to the same cognitive errors as other people.

Indeed, the whole research agenda of behavioral economics is in some sense biased, as its methodology is restricted to looking for deviations from the homo economicus model, neglecting all instances of conformity and the general predictive success of the model. Gigerenzer (2018) calls such an approach the "bias bias" – that is, the tendency

to spot systematic biases even if there are none. In other words, the research agenda of behavioral economics is to uncover systematic violations of norms of reasoning and decision making. But if all one has is a hammer, everything looks like a nail. So, it is not surprising that behavioral economists have managed to find so many cognitive biases.

Lopes (1991) notes that prior to the 1970s, most researchers studying decision making believed that people are relatively good decision makers. The opinion changed not because the research results demanded it, but because researchers started to emphasize some results at the expense of others. In other words, a bias in citations emerged: researchers started to cite articles reporting poor cognitive performance more often than articles reporting good performance, even if published in comparable numbers and in journals of comparable visibility.

Also, while the unbiased approach would not assume a priori that heuristics are flawed or worse than other cognitive processes, for behavioral economists, heuristics are necessarily inferior and fallible methods of thinking. However, the heuristics-and-biases program is not the only view about people's cognitive competences. Other research agendas do not assume ex ante a dismal portrait of people's decision-making competences, but try to study them as they are and to understand and improve people's decision making instead of finding errors (Hertwig and Grüne-Yanoff, 2017).

Moreover, behavioral economists use strong evaluative language to describe experimental results, suggesting that answers to the problems posed and conclusions drawn by behavioral economists are the only correct ones and are not open to debate (Lopes, 1991). However, their views on randomness, their solutions to probabilistic problems, and the relevance of these problems in the real world are far from being uncontroversial (Lopes, 1982).

More generally, behavioral economists seem to neglect the Quine-Duhem problem (Duhem, 1991; Quine, 1980), not noticing that some observed deviations from the homo economicus model might result not from human irrationality, but from the character of the experiments (the content and form of survey questions, the whole context of the research, the type of subjects, etc.). Hence, there are doubts about whether the experimental results can be generalized to real-life settings. And many of the cognitive errors and deviations from rationality allegedly discovered by behavioral economics appear to be artifacts of the laboratory setting, which differs from the world in which people normally act (Smith, 2008).

Edwards (1983) notes that behavioral economists' experimental approach makes their studies grossly unrepresentative both of intellectual tasks and of subjects who might perform these tasks. He also points out that minds vary, and tools and expertise can help in performing difficult intellectual tasks. Hence behavioral economists neglect the heterogeneity of agents and their minds, incorrectly generalizing their results to the entire population or assuming a representative agent. So,

> the studies often cited as showing that people perform such tasks poorly can be interpreted to argue for the opposite conclusion. Obviously, the experimenters themselves, using tools and expertise, were able to perform such tasks rather well. If they had not been, they could not have determined the correct answers with which the errors that purport to show human inadequacy are compared. My conclusion from such studies would be that, if you need to perform a difficult intellectual task, both tools and expertise are likely to be helpful- which seems hardly surprising, if a bit unglamorous. (Edwards 1983, 511)

Last but not least, the research methodology used by behavioral economists leads them to illegitimately draw conclusions about people's cognitive competence. Lopes (1991) points out that the result that people reason heuristically stems directly from the use of the experimental method called "strong inference" (Platt, 1964), which necessitates posing questions in such a way that only two results are possible. This method requires tuning of problems – that is, setting the parameters of the research questions to elicit errors, because only then will they yield unambiguous answers. The problem is that – contrary to the message of behavioral economics – this experimental logic constrains the interpretation of the data. As Lopes (1991, 75) notes, "We can conclude that people use heuristics instead of probability theory, but we cannot conclude that their judgments are generally poor." In other words, behavioral economists' methodology allows them to diagnose the mental process, but not to assess people's performance. Hence behavioral economists who draw conclusions about people's performance when using this methodology commit a logical error and behave irrationally according to their own standards.

7. Conclusions

My critique of behavioral economics is by no means exhaustive. I did not say anything about problems with specific elements of behavioral economics (such as the endowment effect or prospect theory), as I decided to focus on its more general and fundamental flaws related to the issue of rationality. I pointed out five major problems of behavioral economics that undermine its validity.

First, behavioral economists erroneously interpret homo economicus not as an analytical device for understanding human action and explaining it theoretically but as a model of a mental process. They wrongly treat the model as a psychological construct, not as an economic approach used to analyze not merely the behavior of individuals but ultimately the functioning of the whole economic system. Hence behavioral economics is not a new alternative to neoclassical economics, as it is often considered, but belongs to the long tradition of criticizing orthodox economic theory as unrealistic. As Machlup (1978a, 270–271) notes, "The critics of 'classical' economists derided them for their alleged failure to recognize that *homo oeconomicus* was a fiction (or caricature) and for their alleged naiveté in mistaking him for a true picture of reality . . . It is almost comical how the anti-theorists reveled in delight when, having demonstrated the fictional and fictitious nature of Economic Man, they believed they had refuted the classical school and demolished economic theory."

Unfortunately, behavioral economics repeats the same old mistakes.

Second, behavioral economists mistakenly follow Descartes and equate rationality with logical competence. They indeed show some impediments to clear deductive reasoning. However, the fact that people in experimental settings do not always think carefully and use heuristics does not mean that people are irrational in other, broader senses. The concept of rationality used by behavioral economists is thus not adequate, as they assume that people are rational if they behave in line with Cartesian rationality, which is too narrow to be applied to the real, open-ended, nonergodic, and uncertain world.

Third, behavioral economists wrongly focus on individual behavior, even though the functioning of a market economy and other complex systems is inexplicable by the behavior of the constituents of the system. If the institutional structure is appropriate, then imperfections of individual behavior need not result in poor outcomes. In other words, behavioral economists suffer from the constructivist bias—that is, they fail to grasp that a rational economic system may emerge spontaneously, because of human action, not human design.

Behavioral economists abstract too much from institutional analysis because they oppose the homo economicus model as a model of human behavior and want to replace it with a better description of individual behavior – they want to discover the true nature of human beings. But people are neither solely logical or emotional, nor only selfish or altruistic. Instead, people are evolutionarily designed to be flexible and to display a wide range of behavior, depending on the circumstances (Obregón, 2018). People behave differently in small groups of relatives and in large, impersonal markets. Hence it is not possible to fully describe human behavior outside its institutional context.

Fourth, even if we agree that people are irrational, as behavioral economists argue, their policy prescriptions and calls for government intervention or nudging do not follow. This is because behavioral economists do not explain why policy makers, bureaucrats, voters, and experts are not susceptible to cognitive errors.

Fifth, behavioral economists also do not explain why one should believe their findings. After all, if people suffer from cognitive biases, so too should researchers. Indeed, behavioral economists fail to distinguish between people's cognitive limitations and their own subjective judgements as enlightened observers of people's preferences. Moreover, the adopted research agenda (seeking only deviations from the homo economicus model) leads behavioral economists to see biases everywhere they look, even if their research methodology, based on strong inference (it involves posing questions so that there are only two possible answers), does not allow them to draw conclusions about the quality of people's judgments, as the questions were deliberately chosen to enable them to reject easily one hypothesis.

It is a bit ironic that behavioral economists, who oppose the concept of economic man

as the cold and emotionless maximizer of expected utility, are less emphatic than neoclassical economists, who do not judge preferences but treat them as given and who consider all actions, no matter how odd they might seem, as rational and understandable.

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Notes:

1. Importantly, equating bounded rationality with irrationality is a serious mistake (Simon 1957; Gigerenzer and Todd, 2002).

2. However, the term "economic man" was coined by Mill's adversaries in the historical school. It carried a pejorative connotation from the very beginning (Persky 1995; Rodriguez-Sickert 2009).

3. This is what Kahneman (2011, 269) thinks: "My economist colleagues worked in the building next door, but I had not appreciated the profound difference between our intellectual worlds. To a psychologist, it is self-evident that people are neither fully rational nor completely selfish, and that their tastes are anything but stable. Our two disciplines seemed to be studying different species, which the behavioral economist Richard Thaler later dubbed Econs and Humans."

4. *See also Hayek (1948, 15, emphasis in original): "If we put it concisely by saying that people are and ought to be guided in their actions by* their *interests and desires, this will at once be misunderstood or distorted into the false contention that they are or ought to be exclusively guided by their personal needs or selfish interests, while what we mean is that they ought to be allowed to strive for whatever* they *think desirable."*

5. *Contrary to popular understanding, self-interest does not equate with egoism. For Smith ([1759] 1982; [1756] 1977), "self-interest" was strictly linked to, if not a synonym for, "self-love," which was seen as a moral imperative.*

6. *As Posner (1997, 1557) points out, "All that is required to understand altruism as a form of rational self-interest is the assumption of interdependent utilities." Moreover, from the broader, evolutionary definition of rationalism, altruism is not irrational at all, as it strengthens group cohesion: cooperative individuals tend to cluster and interact with each other preferentially.*

7. *I mean here that behavioral economists' view of human nature can be spoiled by the tendency to spot systematic biases even when there are none and that much psychological research paints a different portrait, in which individuals behave more rationally and without systematic biases (Gigerenzer 2018). I write more about this issue in section 6.*

8. *On the "escape from psychology" of neoclassical economics, see Giocoli (2005).*

9. *For example, an individual burning banknotes on the street appears to be behaving irrationally, unless we learn that this is artistic performance.*

10. *For example, psychology can explain where preferences come from, complementing economics, which treats them as given.*

11. *This is partly because psychology deals with procedural rationality, while economics focuses more on substantive rationality (Simon 1976).*

12. *To be clear, I do not argue that homo economicus is not devoid of shortcomings (see Kirzner 1976). It is true that some economists focus too strongly on the profit motive and selfishness instead of focusing on broader utility, as they deal mainly with large markets in which individuals usually display selfish behavior. However, the attacks of behavioral economists on the homo economicus model are unfair, constituting often a strawman fallacy. Such inaccurate criticisms of homo economicus are nothing new. Already in 1898 Veblen (1898, 389) wrote that "the hedonistic conception of man is that of a lightning calculator of pleasures and pains, who oscillates like a homogeneous globule of desire of happiness under the impulse of stimuli that shift him about the area, but leave him intact."*

13. *To claim otherwise is to fall prey to the fallacy of composition. I elaborate on this in section 4.*

14. *Obregón (2018) argues that the popularity of behavioral economics stems from the fact that its practitioners explicitly endorsed homo economicus model as a normative theory, treating irrational behaviors as anomalies or deviations from this benchmark.*

15. *Indeed, people are at the same time criticized as too impulsive and too habitual, too risk averse and too willing to take risks, too optimistic and too pessimistic.*

16. *"The construction of a purely rational course of action in such cases serves the sociologist as a type (ideal type) which has the merit of clear understandability and lack of ambiguity . . . Only in this respect and for these reasons of methodological convenience is the method of sociology 'rationalistic'. It is naturally not legitimate to interpret this procedure as involving a rationalistic bias of sociology, but only as a methodological device. It certainly does not involve a belief in the actual predominance of rational elements in human life, for on the question of how far this predominance does or does not exist, nothing whatever has been said . . . That which is intelligible or understandable about it is thus its relation to human action in the role either of means or of end; a relation of which the actor or actors can be said*

to have been aware and to which their action has been oriented. Only in terms of such categories is it possible to 'understand' objects of this kinds. On the other hand processes or conditions, whether they are animate or inanimate, human or non-human, are in the present sense devoid of meaning in so far as they cannot be related to an intended purpose. That is to say they are devoid of meaning if they cannot be related to action in the role of means or ends but constitute only the stimulus, the favoring or hindering circumstances" (Weber, 1978, 6–7). On Weber's ideal-type concept, see also Weber (1949).

17. This is where the policy prescriptions of behavioral economists come from. I elaborate on them in section 5.

18. Hence behavioral economists commit the biggest possible mistake: they wrongly attack the homo economicus model as an inadequate description of individual behavior, despite its value as a method of economic reasoning, while at the same time they wrongly accept the homo economicus model as an adequate normative benchmark for individual behavior, despite its being neither a realistic description nor a normative standard of human behavior.

19. For example, Demsetz (1996, 490–491) defines rationality as "the ability to recognize patterns in worldly phenomena, to project the conditions that govern these patterns into the future, and to select patterns and extrapolations from these that help to achieve desired goals."

20. In section 6, I share my doubts about the research methodology of behavioral economics and whether it really demonstrates people's irrationality.

21. After all, as Pinker (1997) notes, probability calculus was constructed to generate random results, but many processes in daily life are not random. Poor use of probability calculus should not be interpreted as irrationality.

22. And in consistency of choices. However, given changes occurring constantly in our world, the inconsistency of choices over time is not necessarily irrational, especially since each set of choices can signal important information that changes our perception of offers. For example, we may prefer eating spaghetti to eating steak, but when choosing from a broader set of options that includes also seafood, we might pick steak, as information that the restaurant serves seafood can signal high quality and make good preparation of the steak more likely.

23. Although chess is a well-defined game, the game-tree complexity, or the number of variations possible from the initial position, is estimated to be 10^{120}, assuming that in typical chess positions there are thirty legal plies and that the average game lasts forty moves (eighty plies). It makes chess too complex to act in line with the neoclassical theory of decision making (Shannon 1950; Arthur 1992; Allis 1994). If people played chess in line with the neoclassical theory, the game would be decided before it started, making it uninteresting.

24. However, intuition is also very helpful in close-ended problems, as mathematicians or chess players would confirm. See Mikhail Tal (1997) for an amusing description of how he, the former world champion, during his game with Evgeni Vasiukov, "realized that it was not possible to calculate all the variations, and that the knight sacrifice was, by its very nature, purely intuitive."

25. I mean here such "decisions" as "I quit smoking," "Tomorrow, I will start exercising," or "I have to go to sleep earlier."

26. To be clear, I am not saying that why people buy cars and how they choose the particular model is completely irrelevant. These are very important questions—for psychologists and marketers, but not for economists.

27. See also de Sousa (1987).

28. It can be defined then as maximizing the number of copies of one's genes.

29. Of course, evolutionary rationality is not fully satisfactory, as, first, the conditions that prevailed during most of the existence of human beings were radically different from the current environment and, second, some people decide to commit suicide or to not have children, which clearly does not grant an evolutionary advantage but can still be perfectly reasonable, given their particular scales of preferences. Hence the purely formal definition of rationality seems to be the most satisfactory, as it avoids excessively narrow notions or value judgments about the behavior of other people. This is why Mises (1998) equates rationality with purposefulness. However, a discussion of the Misesian notion of rationality is beyond the scope of this paper.

30. To be clear, while Alchian (1950) relies on the selection argument, Gode and Sunder (1993) base their claim on the market discipline imposed on traders that makes profit maximization not necessary.

31. Kahneman (2011) gives an example of the Scottish Parliament building in Edinburgh: In 1997 it was estimated that it would cost up to 40 million pounds. Ultimately, after many revisions, the building was completed with a few years of delay at a cost of around 431 million pounds, which is over ten times greater than the initial estimate.

32. Of course, they are irrational only when we adopt homo economicus as a normative standard.

33. Once again, what really matters for economics is not individual rationality, but systemic rationality.

34. There are of course more problems with nudging and libertarian paternalism. It implies that the enlightened elite would nudge other people, so they would be charged with determining what is really good for people, or what are the populace's authentic preferences, which seems to be paternalistic rather than libertarian. Another issue with nudging is that it aims to change individuals' behavior by modifying choice architecture rather than by boosting people's competence. See Hertwig and Grüne-Yanoff (2017). For a more detailed critique of libertarian paternalism, see Rizzo and Whitman (2009a; 2009b).

35. See Peterson and Beach (1967) on humans as intuitive statistician – a research program according to which probability theory and statistics provides a good first approximation for a psychological theory of inference; Gigerenzer et al. (1999) on the fast-and-frugal heuristics research program, which sees heuristics not as inherently fallible but as surprisingly efficient and robust adaptive tools; Klein (2008) on the naturalistic-decision-making research approach, which studies how people make decisions in complex, high-stakes, real-world settings such as those of firefighters, airline pilots, and nuclear power plant operators in order to explain the mechanisms behind such people's often-impressive performance given the extremely difficult decision-making environment (Hertwig and Grüne-Yanoff 2017).

36. Similarly, Felin et al. (2019) argue that many perception experiments engage in a "surprise-hacking", i.e., the experimenters stage perceptual experiments by diverting attention with some kind of task, which then "surprisingly" generates results that point out people's perceptual blindness.

37. See also Fudenberg (2006), who points out that behavioral economics typically changes one or two assumptions made by neoclassical economics, neglecting the question of how the entire set of assumptions fits together. Another problem of behavioral economics is that when a researcher wants to incorporate errors of inference into a model, they do not know which biases to incorporate.

38. See, e.g., Juslin et al. (2000), who question the common belief in the hard-easy effect; Hahn and Warren (2009), who show that key aspects of people's supposed misperceptions of randomness actually have probabilistic support; Gal and Rucker (2018), who find that current evidence does not support the concept of loss aversion.

39. The fact that people cooperate within large societies and do not use more violence might be interpreted as a rational decision that stems from acknowledging the benefits from the social division of labor.

40. As Rizzo (2017) writes, "'Odd' behavior should be viewed as an invitation to probe more deeply rather than to condemn. Explanation is hard; evaluation can be easy and cheap."

41. As long as they are consistent. For Austrian economists, truly all actions are rational.