

Interpretations and Theoretical Uses of the Concept of Rationality in Economics

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Abstract

Economic theory has focused on trying to account for the behavior of agents and the results that such performance will have in aggregate terms. Using several assumptions theory has come to build agent archetypes, in search for the most appropriate and possible representation for such behavior. One of the least analyzed but fundamental assumptions are related to the rationality. This term has had different definitions. At first it was treated as a simple capability of reasoning, then it gradually turned into the idea of a gifted agent able to construct sophisticated models in his/her mind (hyper-rational), to finally result in the idea of a social construction process (procedural rationality). This paper aims to briefly explain each interpretation, as well as to describe the theoretical implications for each one, arguing that it is a fundamental assumption which must be explained even more clearly than it has been so far.

Keywords

Rationality, limited rationality, procedural rationality, economic theory, behavioral theory

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Interpretaciones y usos teóricos del concepto de racionalidad en economía

Resumen

La teoría económica se ha centrado en explicar el comportamiento de los agentes y de los resultados que su actuación tendrá en términos agregados, construyendo distintos arquetipos de agente en la búsqueda de la representación más apropiada y posible para tal comportamiento. Uno de los menos analizados, pero cuyas hipótesis resultan fundamentales, es el principio de racionalidad. Esta se trata primero como una simple capacidad de razonamiento, para convertirse poco a poco en la idea de un agente con talento capaz de construir modelos sofisticados en su mente (hiperracional), para finalmente dar lugar a la idea de un proceso de construcción social (procesal racionalidad). Este documento tiene como objetivo dar una breve explicación de cada interpretación, así como describir las implicaciones teóricas para cada uno, con el argumento de que se trata de un supuesto fundamental que debe ser enunciado aún más de lo que ha sido hasta ahora.

Palabras clave

Racionalidad, racionalidad limitada, racionalidad procedimental, teoría económica, teoría del comportamiento

Interpretações e usos teóricos do conceito de racionalidade em economia

Resumo

A teoria econômica tem se focado em explicar o comportamento dos agentes e dos resultados que sua atuação terá em termos agregados, construindo diferentes arquétipos de agente na busca da representação mais apropriada e possível para tal comportamento. Um dos menos analisados, mas cujas hipóteses resultam fundamentais, é o princípio de racionalidade. Esta se trata primeiro como uma simples capacidade de raciocínio, para transformar-se pouco a pouco na ideia de um agente com talento capaz de construir modelos sofisticados em sua mente (hiper-racional), para finalmente dar lugar à ideia de um processo de construção social (processual racionalidade). Este documento tem como objetivo dar uma breve explicação de cada interpretação, assim como descrever as implicações teóricas para cada um, com o argumento de que se trata de um suposto fundamental que deve ser enunciado ainda mais do que tem sido até agora.

Palavras chave

Racionalidade, Racionalidade limitada, Racionalidade procedimental, Teoria Econômica, Teoria do Comportamento

Introduction

With economic interactions becoming more dynamic and complex, economists have sought to enhance their capability to predict and interpret reality through increasingly comprehensive models.

A basic aspect of these models consists of assumptions on how agents perceive environment and how such perception drives them to make decisions. These ideas are connected to the concept of rationality, which tries to explain inner reasons used by individuals to back their decisions—to themselves or to society.

The assumption of rationality or, more exactly, rational behavior has allowed to build better models in science imaginary and to obtain better results with respect to those models that do not assume a stable behavior based on fixed rules (i.e., behaviors which do not necessarily correspond to the idea of rationality), making this assumption a strategic part for generating new ideas, independent of its descriptive forcefulness or its logical status (Aumann, 1997).

However, it is necessary to make clear that the interpretation and the use given to the term rationality differ in each theory. While it was initially seen simply as a characteristic of behavior that distinguished animals from human beings, little by little it became a strict condition limiting what agents could accomplish.

This second view proposed the existence of an agent endowed with special mental skills that permitted him/her to search any amount of information and process it at any cost.

Though this has been regarded as a simplification with no implications, removing rationality from neoclassical models would lead to the removal of several results and conclusions which have given the status of mainstream perspective to this school.

If rationality were not guaranteed, decisions would not necessarily be optimal and an equilibrium without full employment could be found, putting aside the theorems of well-being, because it would be feasible to improve the conditions of some agents with underutilized resources without necessarily decreasing the well-being of others.

Likewise, stability required for entrepreneurs to make long-term decisions would be compromised, as consumers' decisions (who do not take into account necessary full information) would change constantly after each new "discovery" they make.

As it will be shown ahead, these elements and some other implications lead to the necessity that the concept of rationality be seen from a much more concrete and wider perspective.

The first attempts to call attention to this subject came from the work by Herbert Simon (1955), where he presented an economic agent who is unaware of a great deal of the environment and who faces difficulty assimilating and processing data he comes across.

If we add these limited capabilities (which have nothing to do with the specific intelligence of the agent, but they correspond to a changing and complex environment) to a limited amount of time to make the decision, the outcome suggests that agents cannot make decisions with the certainty of their results in almost any circumstances.

This approach was followed by authors such as Daniel Kahneman y Robert Aumann,¹ who developed an alternative theory of behavior based on uncertainty as fundamental axis for human decisions, proving that individuals rarely make “well-informed” decisions in the sense this term has been given in neoclassical theory.

This counterrevolution is remarkable as it deviates from the specific concept and focuses on the limits of human rationality, which, according to Aumann (1997), is essential to build a theory of human decisions coherent with what we really know and what we really will be able to know.

Nearly all heterodox streams of economic thought (neo-institutionalists, post-Keynesians, among others) adhere to this alternative, and so do even some followers of the mainstream theory in a bid to cope with the sharp criticism they have received.

New understandings of rationality and the way agents construct their decisions (even their own goals) can become a useful tool to explain the steady rise of consumption, even in periods of economic depression, speculative bubbles, or the emerging of new necessities for agents, as well as to measure the real scope of social and economic policies which will compulsorily interact with the complex environment triggered by the unstable decisions of people.

This research does not intend to thoroughly revise bibliography and studies about the subject; it simply aims to provide a clear view of the implications this

1 They were awarded the Nobel Prize in economics in 2002 and 2005, respectively, for their works in this field. Moreover, it is important to remark that Herbert Simon was awarded the Nobel Prize for his work in the same field in 1978.

concept has in economic theory and the potential consequences derived from its modification or removal.

The paper is composed of seven sections: Section one is this introduction. The second section presents the role played by the concept of rationality in classical authors like Smith. The third section shows the use given to this concept by the neoclassical school, to point out, in the following section, criticism and implications of such interpretation. The fifth section deals with studies by Simon, together with various interpretations assigned to the concept of “satisfaction,” which lead to three different notions of the term rationality. The sixth section indicates the most recent uses of the term, and, finally, the paper ends with the conclusions.

Classical View of Rational Behavior

The concept of rationality has been employed in economic studies since their beginnings; however, its early perception was similar to the psychological idea of making reasonable decisions guided by the natural tendency of human beings to avoid foreseeable harms. This interpretation could be summarized under the following assertion: *human beings are rational as they do not voluntarily carry out actions they know may harm them.*

Under this premise, social behavior would be guided by the execution of actions leading to the satisfaction of needs with the least possible risk, both for directly involved agents and for those who might suffer foreseeable side effects.

As economic interaction (mainly through trade) grows and covers increasingly wider spaces of social dynamics, individuals face results that are ever more difficult to be foreseen, which additionally affects a progressively growing number of agents.

This rise in complexity drove economists to look for models that would simplify the description of individuals' behavior, giving rise to the idea of a maximizing rationality, or hyper rationality, according to the most recent descriptions of the term.

Hyper Rationality or Absolutism of the Maximizing Agent

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The mainstream paradigm of economic theory² reformulated this definition asserting that, in order to guarantee a rational behavior, *agents will always make decisions that guarantee them the best outcome*, by means of an intricate mental process free of any ethical conception, only pursuing personal well-being (Sen, 2008).

To guarantee this, a set of additional elements are necessary that are related to the availability of information and to agents' processing capability, assuming that a rational performance involves the gathering ex-ante of all relevant information for the problem, so the agent could eliminate any unexpected outcome that can hamper the aim of maximizing.

This conceptualization of rationality may be expressed, depicting an individual, through a relation of preferences that meet some specific conditions³ and can be represented by a function object which, of course, must fully be known by the agent.

This interpretation of rationality is included as a basic assumption in microeconomic models of consumer and producer behavior, where agents seek to reach the highest level of utility (for the first model) or profit (for the second one) by means of a function that represents consumer preferences or technological and budgetary prospects for producers.

The existence of this function of production (for the second case) or utility (for the first one) depends on the fact that agents know all available goods on the market, their prices and the utility (satisfaction) or monetary gain they can generate in any context. Consequently, in case agents are unaware of any of these elements, the function might unexpectedly vary, leading all decisions towards an unpredictable direction at the moment when new information is gathered.⁴

Moreover, agents must know how much income they will be able to dispose from the start of the period, which will not likely change, since, otherwise, deci-

2 We refer to neoclassical theory as the dominant paradigm.

3 Completeness (in such a way that indecision is eliminated from any scene), continuity (to guarantee stability in decisions), and transitivity (which hinders the indeterminacy of decisions).

4 A way to relax this idea is to suppose that all of the agents have exactly the same amount of information, so if there is, for example, some good which is unknown by all of the consumers and producers at the moment this information is revealed, the change will be widespread and it would be considered a structural change that maintains the notion of equilibrium.

sions could result sub optimal due to the fact that it would be possible to allocate very little income for some goods and too much for others; and, likewise, companies might either hoard unwanted stocks (in case income unexpectedly drops in the middle of period, underfunding agents' purchase decisions) or run out of production (if income goes up and agents demand bigger amounts of goods).

Once all necessary information is gathered, agents select consumption and production plans that guarantee them the best possible result (maximization of utility or benefits), that is to say, they act rationally.

Now, as this kind of behavior is the optimal one, every irrational behavior will be erased from the market in the competition process,⁵ because they do not satisfy its needs or because they bring about an economic loss that hinders the continuity of business.

As far as this elimination guarantees the permanence of behaviors predictable by theory, the result of the "interaction"⁶ will be a unique and stable equilibrium, which will remain as long as there is no change that sparks a general revision of individual decisions.

As an extension of this result, theorems of welfare are postulated. According to them, the equilibrium is a Pareto optimal outcome, so, as all of the agents are doing their best possible (taking into account their restrictions), it is impossible to change conditions for any of them without negatively affecting others; then, the result is justified since all of the agents are maximizing and they are at an ideal level of welfare.

In the macroeconomic field, this view of rationality essentially refers more to the view of rational expectations than a characteristic of preferences (Cowen, 2001). It implies that agents fully understand economic behavior and that in case of mistakes in their predictions, these predictions will be compensated, either in the aggregate of agents (an agent who errs by excess will be compensated with one that errs by default) or with the passing of time (the current mistakes will be corrected in the close future), so, eventually, the aggregate is simply the sum of n agents who in the long-run do not make any mistakes.

5 This is the economic version of the natural selection process described in biology.

6 As in this model there are no frictions, the interaction is impersonal and it exclusively takes place in the market through offer and demand, without the necessity of any kind of contact or interference between agents.

In this way, for neoclassical theory, rationality involves the full knowledge of environment and all of the market options, as well as the stability of preferences and objectives of the individual, dismissing the possibility that in the future new needs or alternatives might emerge, which can cause an unpredictable displacement of equilibrium.

Critiques and Implications of the Neoclassical View

"If "irrational" behaviors become widespread, enterprises would not be able to make decisions concerning factorial demands or levels of production, which would lead them to permanently hoard unwanted stocks or to produce very little, triggering a structural shortage, and an unexpectedly low level of benefits".

Though the assumption of rationality is not presented as the most important element within the theoretical description of the neoclassical school, agents' behavior is basic to support the results of the neoclassical economic model.

If rationality is not guaranteed, agents are likely to act under parameters other than maximization or to make decisions that are unsustainable in time, which would be sending wrong signs to enterprises.

We would find agents who excessively save and cut down on their consumption levels or, on the contrary, agents who get into debt to consume, regardless (or absolutely unaware) of their future flow of income and their real possibilities of maintaining current levels of consumption.

This kind of behavior would lead to erratic fluctuations of demand, separating its behavior from current income structure and economic activity, making it unpredictable to entrepreneurs.

If "irrational" behaviors become widespread, enterprises would not be able to make decisions concerning factorial demands or levels of production,

which would lead them to permanently hoard unwanted stocks or to produce very little, triggering a structural shortage, and an unexpectedly low level of benefits.

Similarly, decision-making, without guaranteeing maximization, would leave unsupported the theorems of welfare, since equilibrium situations might turn out

to be sub optimal and there would constantly be badly used resources which could be re-distributed to improve conditions for the whole society.

Moreover, this conception has a series of implications in the sense of economic growth.

Rationality guarantees a perfect competition market structure because it means that all of the agents will count on enough information to maximize their functions-objective, so that no one could have an advantage in the sense of privileged information that makes it possible to control the market. In this way, any attempt from an enterprise to differ from its competition will immediately give rise to the imitation of the process and copy of the product, whereby market participations will level again without bringing any extraordinary profit worth the investment made to innovate.

In the absence of a payment that makes innovations attractive, enterprises will not be willing to do or finance research, due to which technical changes will be impossible to justify. And, moreover, as the optimal use of resources also implies their full utilization, growth could not be explained with the addition of new enterprises, identical to those already existing.

Summing these elements, the conclusion is that the neoclassical model cannot explain neither growth nor the accumulation of factors, except by population growth, which ends up being a contradiction, since it supposes that the growth of population ends up being an obstacle for an increase in production.

Limited Rationality

Clearly, neoclassical view, together with its implications, has been the target of numerous critiques, mainly because of its unawareness of the uncertainty agents permanently deal with, and the capability they have to gather and process information that may potentially be relevant for each problem.

We are going to appeal to a small experimental test employed in basic courses of economics which will show the fragility of neoclassical view.

Imagine the following situation: at night, you are arriving to your house and you notice that in the middle of the road where you usually have to cross and which is always dark and empty a person is being mugged. What would you do?

99 percent of people answered that they would take another road, go back, or look for a shelter until danger disappears.⁷ Anybody would say it is a rational decision because they try to avoid a certain harm.

Here comes the second part of the problem: you have been able to safely arrive home and five minutes later your father (or maybe your husband or wife) arrives, and he tells you he has just been mugged in the middle of the road. With this information, what would the best decision have been?

In this case, as they are unaware of the fact that it would surely result in double mugging and that they would be able to do little for their relatives, not to mention the economic harm (i.e. a bigger monetary loss), most people are guided by emotional reasoning and assure that the best would have been to attempt to help.

If this is the best decision, according to the economic theory of rational behavior, what should be done in this situation? You know that you probably know the mugged person, so when you see the scene, you should imagine that your help would be necessary; nevertheless, if the situation deals with a stranger, the benefit from helping would be minimum (remember that we, at first, decided to get away from the scene, assuming the problem had nothing to do with us), so you should get enough information before taking a definitive decision.

The question is: how to get all the information? Remember you are at night in a poorly illuminated street, so you will not be able to identify the mugged person's face. The only feasible alternative would be to get closer to the scene, watch the unlucky person being stolen, and, as soon as you have checked whether such person is a relative or not, decide on whether to help or to allow the mugger to freely continue the assault.

This solution seems illogical from any perspective; once you get into the scene, it is unlikely that you can leave it unharmed. In addition, if the victim turns out to be a stranger and you simply go away with disregard, you implicitly become an accomplice in the mugging.

With this simple example, agents are proved not to act rationally in the sense neoclassical theory predicts, as they are not even able to determine which infor-

7 This example would also allow to prove that the aggregate is not the simple sum of the parts, because during the discussion most people came to the conclusion that, if they go in group, they will undoubtedly help, concluding that the result of putting 10 "cowards" together is a "very brave" group.

mation would be relevant and to what extent their actions may have unexpected consequences.

Herbert Simon's works (1955) meant the starting point for this criticism. According to Simon, agents do not pursue to maximize any specific function, since they do not have all the information they might require (sometimes even to build the objective itself), so they stop when achieving a good enough outcome, though this is not the best possible.

The term "limited rationality" emerges from these works, which is used to designate rational choices that keep into account the knowledge an agent can possess, as well as his/her capability to recall such knowledge when it proves to be relevant (Simon, 2000).

This new version of the term rationality has been the object of various interpretations.

For some authors, it is only an alternative to describe rationality as it is proposed by neoclassical theory, because the agent makes decisions with the optimal amount of information, stopping the search for new data when the cost to obtain them is bigger than the profit which could be reached by taking an "even better" decision, in such a way that the principle of satisfaction would only be the representation of the optimal behavior under the existence of transaction costs or restrictions on the information.

For other authors such as Kahneman (2002) Simon's conceptions are useful to explain the learning process, as mistakes an agent can make force him/her to revise his/her decisions and to acquire greater skills to process information and take better decisions.

Under this interpretation, the process of satisfaction must be perfected with time, until the agent will be able any time to make optimal decisions which allow him/her to reach his/her objectives.

This view has specially been introduced into microeconomic models in order to account for interaction processes, by means of the creation of adaptive expectations, where, depending on the agent's learning capability, it is possible to determine a speed in adjusting and correcting mistakes.

If this process takes place with no frictions between agents, it will yield a long-run equilibrium with the same characteristics as the one described by neoclassical theory. This outcome is guaranteed insofar as agents end up learning enough, and with enough amount of information —supposing that they gather an extra

amount of information each period and that they only pay for it once—to make fully rational decisions (hyper-rational).

If, on the contrary, these learning processes take place amid a scene of permanent interaction, where aggregate decisions reflect individual mistakes, market signs may lead to wrong decisions, since we would never have the certainty of which information is right and which comes from a widespread mistake.

In this second scene, long-term equilibriums will not necessarily be full employment ones, and they will be affected by short-term scenes, creating situations of constant uncertainty.

An Anthropological Perspective

The option of a decision-making process marked by the existence of frictions leads to another critique commonly made to the neoclassical view of rational behavior, that is, the omission (excessive simplification) of interaction processes, regarding man as an asocial being, independent of his environment.

From this point of view, the only interaction that enables genuine rationality is a parametric one, in which acting rationally means to do the best possible for oneself (Elster, 1990), ignoring the effects other can have on our decisions and even on our possibilities.

Writers such as Elster and Piore (1995) explain in their works how the environment influences both available options and perceptions on them by the individual.

In a social environment, agents will perceive available options in a different way, dismissing some for reasons beyond economic concerns (embarrassment, anxiety, blame, pride, among others) (Martínez, 2004). Thus, the “so-called” faults in rationality may be related to the social interaction of individuals (Malo, 2002) in such a way that the rationality degree ends up being an endogenous variable defined by the context where decisions are made and they are not a natural characteristic of the individual.

Now, if we take into account that man is an essentially social being and that individual decisions are measured by a regulatory system, behavior is not rational but reasonable (González, 2003), and, in this context, equilibriums may be sub optimal.

Therefore, we must consider the idea of a strategic interaction, in which individuals see their behavior as a variable among many others (Martínez, 2004), and

which gives rise to processes with unknown consequences, hampering agents from making a decision that guarantees them the best outcome.

Similarly, there might arise situations unlikely to yield an optimal result in the short-run, and, nevertheless, such result will provide conditions to reach a better one in the future; for example, to resign from a current job to seize a study opportunity that ensures better future salaries and higher social recognition, which, if not interpreted rightly, may be regarded as a wrong decision and irrational behavior.

These restrictions let us approach to an anthropological view, in which rationality is to be understood as the widespread capability of human beings to be involved with the future, in contrast with near-sighted and gradual ascent of natural selection (Martínez, 2004).

In this context, decisions which could be irrational in the light of economic theory (as they fail to generate an optimal result) are explained by a wider view from the individual who pursues both nonprofit (recognition, acceptance, etc.) or long-run rewards, even at the cost of a present economic sacrifice.

This last structure is connected with the last interpretation taken from Simon's works, the idea of procedural rationality.

Time, Interaction, and Uncertainty

Based on empirical evidence, several studies have shown that agents fail to learn from their mistakes (Binswanger, 2011), and that the alternative of making full action plans that contain contingencies for each possible situation would be highly costly, as well as complex (Peberton, 1993), in an environment in which conditions can change any moment with no agent being able to rightly foresee them.

This makes us look for an alternative proposal, in which agents make decisions aware of their limitations. This alternative is what has been called *procedural rationality*.

Talking about procedural rationality involves a decision-making process based on subjective rules, which are built through observation of the environment by the agent.

These rules can be built or left unconsciously (Aumann, 1997) and they simply reflect the perception of agents concerning rules that work adequately for the particular needs of each situation.

One of the principal ways to build these rules is by means of imitation (Lavoie, 2005); a process in which agents observe the behavior of those who they consider successful, and then try to act in the closest possible way, thinking that it will lead to an equivalent result.

This type of procedures can be applied in business decisions, as demonstrated by Riedl et al. (2013), who assure that enterprises observe their most successful competitor to follow its decisions on the optimal production level, reducing, in this way, uncertainty and trying to maintain a specific place in the market.

Now, this kind of construction is associated not only with the way decisions will be made, but also with the intended objective. This is described in a more concrete way by Modarres (2002), when he expresses that decisions are normally associated with emerging objectives which did not exist before the decision-making process started, and that such objectives emerge observing what other agents are looking for in similar situations.

If agents act in this way, it will be impossible to establish a unique and stable behavior (eliminating, moreover, the theoretical figure of the representative agent), with which time, interaction, and uncertainty become key components of any model that includes this sort of rationality.

With this kind of behavior, we might explain situations like speculative bubbles, which begin at the moment when an unjustified behavior becomes widespread just by simply imitating the main particular market traders, bolstering their beliefs or their interests.

Likewise, speculative bubbles burst when, in a widespread way, expectations are assumed to go in the opposite direction to that expected before the crash.

These interaction scenes explain the emerging of social needs, which, through imitation processes, lead agents to believe they need the goods that others (their referents) possess and to include them in their own scale of needs. In this way, by means of this kind of actions, gadgets like cell phones, state-of-the-art vehicles, among others, become necessary goods, even when few years before people used to comfortably live without them and even without knowing they could exist.

In the microeconomic framework, the significance of this view implies the impossibility to assume that the aggregate is the simple sum of agents, since the interaction tends to modify all the elements of individual behavior, causing decisions, which could initially be optimal, to be seen now as inadequate; this leads to a substantial change, as shown in the example of the mugging in the third part of this document.

This makes the aggregate turn into a dynamic entity, which will permanently change in directions sometimes unpredictable, and whose variability could become greater in time.

This view is what post-Keynesian theory has called the fundamental uncertainty principle; agents must deal with it, admitting their limitations and the possibility to have results very different from the expected. Moreover, uncertainty will increase as the time horizon also grows.

This rise in uncertainty can be explained by this fact: the longer the period of time between setting the objective and executing the decision is, the bigger the number of signs received from other agents will be, which will lead to a more uncertain revision of actions, and which will make time a basic economic variable.

This interpretation is closer to the reality observed in various empirical works and in the findings of experimental economics, but it offers the great challenge of building solid theoretical models that include unpredictable dynamics (random disruptions which, moreover, affect the long-term result) and that do not try to separate the short- and long-terms as independent entities, because it is clear that what happens in the short-term will substantially affect decisions that individuals make in the medium- and long-terms.

"This makes the aggregate turn into a dynamic entity, which will permanently change in directions sometimes unpredictable, and whose variability could become greater in time".

Conclusions

The concept of rationality is ubiquitous in economic theory as it determines reactions from agents and allows explaining structural situations. Far from being a simplifying assumption, it is the basis of every structure, since a great part of results would be altered as parameters determining behavior are modified.

In this respect, the idea of a hyper-rational agent implies the justification of income distribution, no matter its result, because if decisions were rational and the result impossible to be modified (under the Paretian conception), poverty would end up being the result of an irrational performance that must be punished with

the process of market exclusion, and we would not have any reason to worry about a distributive justice.

238 Such idea also implies the acceptance of genuine individualism, under the concept that consequences individual acts generate on the rest of the society do not matter, and that the aggregate would be simply the sum of the strongest agents who have been able to “survive” market dynamics (in symbolic and almost literal terms).

On the contrary, if this assumption is put aside, may justify the existence of regulatory policies that try to mend market defaults and compensate those who, for initial conditions, appear to be disadvantaged.

We will also be able to explain the various dynamics of growth, looking at them from accumulation or from structural change, including the needs of agents and how these are built amid a dynamics of imitation, leading to the concept of social creation of needs.

Finally, time is another variable which acquires importance when the idea of a hyper-rationality is abandoned, because processes of observation, learning, and imitation become different as agents have more or less time available to make their decisions.

And, similarly, as these decisions are changing, they will generate different results at different points of time, also debunking the idea that the long-run is a characteristic independent from short-run disruptions, since they generate changes in the objectives and rules of behavior for agents, in such a way that the long-run is the sum of a series of short-run processes which interact with tendencies toward agents want to go.

The best starting point for these modifications is still Simon’s work, but it must not be interpreted as a simple maximization of the amount of information desired to be obtained, but as a fully dynamic process, usually unpredictable.

The great challenge is to achieve that models with enough technical strength show this type of dynamics, without losing their closeness to reality, and which keep the ideal of realism above the instrumentalist view characteristic of neoclassical theory.

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