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*The rationality principle as a universal
grammar of economic explanations*

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Abstract: A universal grammar of economic explanations is characterized by the means-end rationality principle, which can be understood by drawing a conceptual distinction between its two facets: theoretical abstraction and empirical content. The former serves as a pure form of economic way of thinking and thus delimits the capacities of economists to perceive and understand the manifold human behaviour. The latter provides economists with objects of thought and renders the discipline empirically relevant. Given the implications of the two facets of rationality, the main task of economics as a descriptive science is to incorporate appropriate empirical content into the pure rational framework with the aim of better explaining and predicting human behaviour. As a prescriptive science, economic inquiry should draw on the persuasion and communication skills of its practitioners, thereby influencing the state of the economy through changing the means and ends of the decision makers in question.

Keywords: rationality; constrained maximization framework; epistemology

Introduction

This paper is founded on the very idea that economics is a rational choice theory, no more no less. It is a key to understanding a series of fundamental questions, such as what do different economic approaches share in common, are there logical limits for economic inquiry, how do economists explain human behaviour, and what can they do to improve real world human well-being? This claim, which defines the methodological heartland of economics, is also controversial and generally misunderstood by both the professionals and lay public, who hold fallacious beliefs on the very nature and task of economics as a distinct intellectual discipline.

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In a way, such misunderstanding stems from the widely shared view that mainstream economics is a study of the *rational* choices made by a specific conceptual species of human being, called *homo economicus* or economic man, whose actions can be theorized by applying the constrained utility-maximizing framework. The latter, in the neoclassical scheme, refers usually to the maximization of material benefits (often measured by consumption or profits) by omniscient and self-interested agents, who are merely subjected to budgetary / resource / technological constraints. As the *root of all evil*, this alleged first principle of economics has long been an inviting target for critics because of its poor explanatory and predictive powers for real world phenomena. In particular, since the onset of the Global Financial Crisis (GFC) in 2008 and the resulting worldwide economic recession which economists as a group failed to predict, the practitioners of the dismal science, especially those who extolled the virtues of the *laissez-faire* economic system, have been blamed for their inaccuracy and even arrogance. In this regard, the assertion that Hayek made in his Nobel Lecture some forty years ago is surprisingly fresh: 'As a profession we have made a mess of things' (Hayek 1974).

The above assertions, however, seem to be justified on the grounds of a series of tired ideas repeated for centuries, which go back, at least, to Adam Smith's *Theory of Moral Sentiments* (Smith 2007): real people, motivated by ethics, emotions, social norms, physiological factors, and other non-pecuniary considerations, might have unstable and inconsistent preference structures, as well as limits on computation, reasoning, willpower, information, and many other things. Simply speaking, people are not always *rational* in the neoclassical sense, and thus, those research programmes in economics based on assumptions of this narrowly defined rationality are doomed to failure. As is well known, these arguments have already been intellectually systematized and advanced by some critical departures from the neoclassical agenda, such as behavioural and neuroeconomics, which, supposedly, make *homo economicus* evolve into *homo sapiens*, who might follow rules and habits, commit mistakes, act on impulse, fall in with the crowd, have sympathy for the well-being of others, and so forth.

In response to the criticisms, some defenders of neoclassical economics contend that the rational choice modelling based upon the *homo economicus* hypothesis is not true but *almost true*, and therefore, can be viewed as a *good enough* approximation of empirical reality. According to them, the fictional features of conventional rational choice assumptions are a *necessary evil* for the sake of theoretical abstraction and, more importantly, they bring about only some minor deviations

from the factual truth. This view is shared among some brilliant thinkers, such as Schumpeter (1934) who once wrote,

[t]he assumption that conduct is prompt and rational is in all cases a fiction. But it proves to be sufficiently near to reality, if things have time to hammer logic into men. Where this has happened, and within the limits in which it has happened, one may rest content with this fiction and build theories upon it (p. 80).

More interestingly, Karl Popper, who coined the term *rationality principle*, also argued that this principle '...is actually false, though a good approximation to the truth' (Popper 1985, p. 362).

Another endeavour to shore up the fundamental role that individual rational choice plays in economics can be found in some forms of instrumentalism. In a landmark paper on the methodology of positive economics, Milton Friedman summarizes the central thesis of his instrumentalist position as follows: 'The ultimate goal of a positive science is the development of a "theory" or "hypothesis" that yields valid and meaningful (i.e., not truistic) predictions about phenomena not yet observed' (Friedman 1953, p. 7). According to him, 'theory is to be judged by its predictive power for the class of phenomena which it is intended to "explain"' (p. 8-9). In the light of this instrumentalist argumentation, the degree to which the hypothesis is realistic does not matter unless it has an impact on the predictive power of the theory under consideration. In fact, for many economists following this instrumentalist tradition, the neoclassical hypothesis of rationality does its job well.

However, both defending arguments seem untenable when considering the following counterargument: in practice, economics appears to lack the sufficient empirical success that the justification for their claims demands. In particular, the dramatic events of the past twelve years or so in the world economy have highlighted the limitations of neoclassical modelling on the basis of narrowly defined rational behavioural assumptions. For example, in his Presidential Address at the 2003 American Economic Association annual meeting, Robert Lucas, one of the most influential neoclassical theorists, declared that the central problem in macroeconomics – namely, depression prevention – 'has been solved, for all practical purposes' (Lucas 2003, p.1). About five years later, however, in the wake of the GFC, the former Federal Reserve Chairperson Alan Greenspan pointed out a profound flaw in free market ideology and conceded that 'I made a mistake in presuming that the self-interests of organizations, specifically banks and others, were such as that they were best capable of protecting their own shareholders and their equity in

the firms' [11]. Furthermore, equally motivated by the GFC, Colander et al. (2010) argued that since various behavioural anomalies in financial markets are not taken seriously in the mainstream modelling, among other reasons, academic economics experiences a systemic failure. To summarize, the economic theories based upon the neoclassical concept of rationality provides neither a good enough approximation to the real-world behaviour nor are very successful in terms of prediction and various policy issues.

To deal with the fundamental methodological issues raised in this heated debate, the current study attempts to shed light on some universal features of economic explanations that various strands of economic thought share, with or without the awareness of their members. As will be elaborated below, the central claim of this paper is that economics, as what economists actually do, can be identified as a way of perceiving the world through the prism of the means-end rationality principle in its broader sense. As an ultimate given of the discipline, the latter forms a universal grammar or a general structure of economic theories, and thus delimits the capacities of economists to observe, explain, and understand the manifold of human behaviour. It is by this logic that economics is nothing but a rational choice theory. As a result, *non-rational* aspects of behaviour, by which we mean those beyond means-end consideration, merely transcend the scope of the discipline and thus, are beyond the reach of economists. Furthermore, in the light of this grammatical essence, the twofold task of economics can be illuminated. As a descriptive science, by pushing the economic approach to its logical limits, the main task of economists is to collect and organize appropriate empirical materials according to the means-end relationship with the aim of better explaining and predicting human behaviour. Meanwhile, as a prescriptive or policy science, economics is aimed at improving real world decision-making and social arrangements. To achieve this goal, as the grammatical rule based on the rationality principle allows, economists should draw on their persuasion and communication skills, thereby changing the means or/and ends of the relevant individuals. Otherwise, no improvement is thinkable.

The remainder of this paper is organized as follows: the next section discusses the principle of rationality and proposes a conceptual distinction between theoretical rationality and empirical rationality, which corresponds to pure theoretical abstraction and its empirical counterpart, respectively. The third section explores the relationship between the two concepts of rationality and deals with relevant criticisms. The fourth section provides further clarifications on five often misunderstood points in relation to rationality in economics. The fifth

section addresses the twofold task of economics in terms of both description and prescription, which is directly implied by the rationality principle. The last section concludes the paper with a discussion about the methodological reflections in the wake of the 2008 financial crisis.

Economic rationality and its two facets

The clue to understand the universal grammar of economic explanations lies in one of the discipline's most central concepts, *rationality*. The latter refers to, in the usual way of economic theories, the quality of allocating scarce means among competing ends. Such an interpretation of rationality constitutes the heart of the path-breaking definition of economics proposed by Robbins (1935) in his famous *Essay*: 'Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses' (pp.16).

At this juncture, it should be clarified that the *end* in its plural form should refer to some *intermediaries* to reach an intrinsic or ultimate end, whether called *utility*, or *happiness*, or by any other names. From a methodological perspective, economics cannot deal with different ends which are intrinsic for their own sake, or, alternatively, those which cannot be measured by a common metric [2]. Indeed, it seems that even Robbins himself would agree with this account in writing as follows: '... [T]he ends have different importance' (Robbins, 1935, pp.12) and 'when the ends are capable of being distinguished in order of importance, then behaviour necessarily assumes the form of choice' (pp.14). The term *importance* as invoked in these quotations, is nothing but an implicit way to describe the magnitudes of utility that correspond to different intermediary or instrumental ends. Ultimately, an economic agent who is capable of ordering his/her ends by importance has indeed only one intrinsic end to achieve — maximize some *single thing*. In this spirit, the means-end rationality suggested by Robbins can be revised as the quality of allocating scarce means among competing intermediary ends to achieve some 'ultimate end' (or, at least some end of higher order).

If we further define the latter as 'maximizing utility', then the revised rationality principle above is reduced to a more familiar model of human conduct utility maximization subject to constraints.

Nevertheless, this familiar theoretical framework also appears to be a *stranger* to its everyday users — economists. As will be discussed below, to a large extent, the

misunderstanding and confusion on this concept is due to the failure to draw a conceptual distinction between the two facets of economic rationality, which can be labelled as *theoretical rationality* and *empirical rationality*.

By *theoretical rationality* or alternatively, *a priori rationality*, we mean the basic logic of the economic way of thinking: economists perceive and crystallize the manifold of human behaviour through the prism of means-end relationship and thus explain in terms of utility and constraints, no matter what the terms 'utility' and 'constraint' refer to. This notion of rationality establishes a universal but contentless grammatical rule for economists to represent human behaviour in a structured way, often called as 'the economic way of thinking'. Like any other distinct subject, economics does have its own predefined nature, epistemological limits, and especially its own necessary *ultimate given* (see Mises 1949, and Hey 1993). Logically, it is not treated as subject on its own to any kind of empirical tests, and hence should not be viewed as an approximation to the empirical truth as incorrectly believed by some leading thinkers such as Schumpeter and Popper (see Introduction of the paper). For example, holding all other things equal, whether a representative agent maximizes his/her monetary payoff can be empirically observed, whereas it is not the case if 'monetary payoff' is replaced by 'utility' or simply 'something'. In this sense, theoretical rationality turns out to be a metaphysical notion [3], which defines the nature and epistemological boundary of the subject. In this light, the aspect of human behaviour subjected to economic inquiry □ no matter what school is in question (such as Neoclassical, behavioural, or Keynesian...) □ is necessarily rational, and hence can be, in principle, incorporated into a somewhat maximizing framework [4]. Accordingly, economic analysis not only starts with, but also ends up with some rational representation of human conduct. Furthermore, by its aprioristic feature, the principle of theoretical rationality holds true regardless of the situation in which the object of economic inquiry is involved. That is to say, economists use the same prism to scrutinize and explain the behaviour of a medieval monk in Paris and a Twenty-first Century businessman in Mumbai. In this view, the notion of theoretical rationality is also *ahistorical* and *context independent*.

By *empirical rationality*, or, alternatively, *a posteriori rationality*, we mean the empirical content, raw materials, or data, which are structured on the basis of theoretical rationality. To continue the example illustrated above, when assuming that this economic agent always maximizes his/her monetary payoff subject to technical/resource constraints, economists set up an *ad hoc* maximizing framework, or, alternatively, a certain empirical version of rational choice. Once this has been done, economic models become empirically relevant, and thus their goodness can be

judged by explanatory and prediction powers or by other criteria. In this regard, it should be emphasized that when claiming an individual who, for example, refuses positive offers in the *Ultimatum Game* (Nowak et al. 2000), behaves irrationally, it is necessarily in reference to some benchmark model. Here, by the term *irrationally*, economists merely mean this individual behaves differently from what is implied by the benchmark assumptions. However, they do not mean that the player's choice is not out of means-end considerations, or, in other words, is not governed by theoretical rationality. Additionally, it is obvious that individuals, such as the aforementioned monk and businessman, may have different variables in their utility functions and sets of constraints. Therefore, it turns out that the empirical content of rationality is *historical, context-dependent*, and in a constant state of change.

Eventually, as will be further discussed in the next section, a meaningful economic model or theory should be a combination of theoretical rationality and empirical rationality, which is essential to economic explanations. It seems absurd, even unimaginable, to break this mix of deduction and induction, and then to keep one and abolish another.

Relationship between the two concepts of rationality and relevant criticisms

Unfortunately, the necessary combination of the two concepts of rationality has been ignored by many practitioners of the subject, who perpetuate some misconceptions about the relationship between the theoretical abstraction of rationality and its empirical counterparts. In particular, there are two representative but misguided criticisms of the status of the rationality principle in economics.

The first criticism is that the scope of economics has been narrowed by focusing exclusively on the narrowly defined rational aspect of behaviour (for example, in the neoclassical sense defined previously). It is a common view shared amongst many critics of the rational choice theory and/or neoclassical economics (see Simon 1955, Sen 1977, Ariely 2008, and Keen 2011), who are particularly concerned about the simplistic theorizing of human conduct by sidestepping behavioural anomalies, other-regarding preferences, historical conditions, institutional environments and other nonconventional economic/behavioural variables, which have been found to play important roles in explaining human behaviour and social phenomena (see Kahneman and Tversky 1979, Camerer et al. 2005, Hodgson 2001, and World Bank

2015). This criticism can be referred to as the *too-narrow view*, which implies that according to its advocates, the concept of rationality in economics, especially in the mainstream, is inappropriately narrow and thus too unrealistic to accommodate the complex practices of economic agents. In view of that, as claimed by Dan Ariely, a prominent behavioural economist, one should end the 'rational economics' in favour of alternative theories like the behavioural approach (Ariely 2009).

The second is that by basing economics upon the axiomatic and unquestionable rationality principle, especially its central theoretical core – the concept of utility, economists risk ending up with far too broad a discipline to be useful. From this angle, the dismal science appears to be guilty as charged of being an empty and irrefutable tautology (see Coase 1978, Rosenberg 1979, Green and Shapiro 1994, and Hodgson 2012). This criticism can be referred to as the *too-broad view*, which implies that with an inappropriately broad concept of rationality, economics may seemingly accommodate everything but actually explain nothing.

Although both views somehow contribute to the methodological discussions, neither is based upon a well-defined framework of rationality. On the one hand, in a sense, the *too-narrow view* is a good example of *self-created fallacy*: the people who hold this view *first* narrow the rational choice theory down to certain specific versions of rational model – in most cases, the neoclassical version – and *then* criticize the theory, especially its empirical relevance. Turning back to the example of *Ultimatum Game*, according to our argumentation on the rationality principle, it merely suggests that in addition to monetary payoff, the players of the game care about *fairness* or other considerations. In this view, their behaviour is only irrational with reference to the neoclassical model, but it is by no means a valid counterexample of maximizing behaviour. Furthermore, besides the goal, the set of constraints can also be adjusted to accommodate the outcomes of the game, such as including computational ability, bounded willpower, imperfect information, moral commitment and so forth, which might lead the players to make a choice corresponding to a lesser degree of utility [5].

All in all, when a parsimonious rational model (say, the one in the neoclassical sense), is stretched to take into account the maximization goals and behavioural constraints which are closer to reality, it is just replaced by another rational model with different constituent elements but always with the same structure. Unfortunately, many economists incorrectly equate the specific neoclassical paradigm with the general theoretical construction of the rational choice model. Among them, we can mention an example provided by George Stigler, who argued:

'...the very logic of economic theory: we deal with people who maximize their utility, and it would be both inconsistent and idle for us to urge people not to do so. If we could persuade a monopolist not to maximize profits,..., our theory would become irrelevant' (1980 p. 150). Plainly, Stigler's first sentence is in perfect accord with the main idea of the current study, while the second one reflects that he conflates the pure concept of *utility* with one specific version of its empirical counterpart proposed by the neoclassical theory, *profits*.

On the other hand, our emphasis on the purely abstract theoretical rationality does not imply that human conduct can be understood, say, through a kind of deductive reasoning a la Descartes or even through *winning by definition* without looking at the external world. Theoretical rationality has, however, something informative about the real world if and only if it is combined with empirical content. To gain a deeper understanding, two concrete examples seem helpful. First, the relationship between these two kinds of rationality can be compared analogously to that between abstract grammatical rules and the corresponding content of language, such as the 'subject-verb-object' formula and the sentence 'John drinks coffee'. Here, neither the formula per se nor the three words of the sentence without *a priori* defined structure are able to communicate. Another example is about cake mold and its fillings.

Whatever the materials we pour into a mold, such as water, milk, oil, wine, or any mix of them, they adapt themselves to the form of the same mold. At the end of the day, they turn out to be different cakes from different recipes (such as Neoclassical style or Keynesian style), but all sharing a same form given by the mold. In short, both the mold and materials are needed to make cakes.

However, the people who claim that the rationality principle is too broad to be meaningful strip the empirical materials from their theoretical *container*. As a prime example of this view, Hodgson (2012) ironically argued 'Q: Why did the chicken cross the road? A: To maximize its utility' (p. 101). It is clearly an irrelevant caricature, because virtually no economic inquiry ends up with that answer, which is to say, it only explains behaviour in terms of unobserved utility. Serious economists have to further investigate the 'chickens, roads, specific motives, developmental histories, or detailed causal mechanisms' (Hodgson 2012, p. 101) in search of a better model judged by either explanatory or predictive power. By this kind of practice, or as some call it, the *content-enriching strategies* (Vanberg 2012), economic theory makes progress. Nevertheless, no matter what kind of progress, it should again be stressed that the fundamental characteristics and epistemological limitations of the subject remain unchallenged, just like the 'subject-verb-object'

formula remains the same whether we say 'Ted eats eggs' or 'John drinks coffee'. Likewise, the form of a cake mold does not change whether we fill it with different materials. Of course, the chicken's behaviour can be studied from angles other than a rational choice model, but it transcends the ambit of economics.

In a nutshell, without theoretical rationality, or, equivalently, without perceiving human conduct as a matter of means-end consideration, economic inquiry is simply impossible unless economists are satisfied with the mere reporting of facts, without explaining them [6]. Meanwhile, without empirical rationality, economics ends up with an empty tautological or metaphysical statement, which is empirically irrelevant. In this view, it is noteworthy that our idea of the two-faceted rationality draws inspiration from Kantian epistemology (Kant 1998). As the German philosopher argues, 'thoughts without content are empty, intuitions without concepts are blind' (p. 193-94). Loosely speaking, by this famous phrase Kant means that to gain knowledge both intuition and conception are required. The former gives us a concrete *object of thought*, while the latter affords us a certain *pure form of thought*. To some degree, this is reminiscent of our account of the inseparability of the two concepts of rationality.

Further explanations on rationality

To avoid confusion, five points about rationality in economics need more clarification. Firstly, in no sense do we claim that such a way of thinking is the only or the favoured one to explore all kinds of human behaviour. Unlike a general theory of human action (notably the praxeology proposed by Mises 1949), it is merely concerned with one specific aspect of behaviour, namely the *economic aspect*, which the framework of means-end rationality is able to detect. In this regard, it is recognized that a significant contribution of Robbins to the definition of economics lies in his rejection of the idea of *economic behaviour* (see Kirzner 1960, Chapter 6, and Backhouse and Medema 2009). Following Robbins, we may claim that neither a pure economic behaviour nor a pure noneconomic behaviour exists. The economic aspect of behaviour of all kinds is necessarily rational in nature. There should, however, be some aspects that lie outside the boundaries of economics, and thus, we need closer interdisciplinary collaborations. Plainly, the latter can be possible only when there exist different distinctive disciplines.

Secondly, applying the rationality principle to human behaviour does not, however, require that human beings necessarily act upon deliberations and definite means-

end considerations. In fact, as widely observed, many human actions and inactions might be, or at least look like, purposeless and without forethought. As a pure form of thought, however, the concept of rationality implies that all decision makers are deemed, from an economic standpoint, *as if* they were rational beings. In this regard, there seems to be no need to worry about whether rationality is a kind of substantial law in decision making processes. What is important is whether the economic way of thinking could help us to gain insight into human choice and to make better predictions and decisions. Apparently, our position shares some common features with the *as-if* thesis proposed by Alchian (1950) and Friedman (1953). Although both these respected economists adopt an approach which also dispenses with motivation and foresight, here we provide an alternative account of this thesis: structuring, either explicitly or implicitly, in the light of the constrained utility maximization indeed constitutes a necessary element of economic explanations, and it is simply taken for granted so that economists can practice their discipline, no more no less. For example, after jumping from a diving board, a diver's body goes down. Obviously we know this phenomenon is due to gravity, it is, however, not an explanation from the economic point of view. Indeed, no explanation of such kind can be offered for the motion of this diver's body as long as it cannot be rationalized through the mean-end relationship.

Thirdly, the rationality principle is not inconsistent with the so called rule-following behaviour to which a fairly large and growing literature has been devoted (See, among others, Heiner 1983, Langlois and Csontos 1993, Fehr and Schmidt 1999, Ostrom 2000, and Vanberg 2012). Although it is commonly believed to be a competing theory to the rational choice model, in the light of Robbins' argumentation, rule-following is equally a kind of composite behaviour and thus economic inquiry can filter out some, but not all, of its constituent elements. Following the argumentation about the rationality principle shown in previous sections, rational choice and rule following are neither contrasting nor complementary approaches. Their relationship looks more like that between a way of thinking and an object of thought: economists account for the rule-following behaviour only in terms of constrained maximization framework. More importantly, they also check whether individual agents continue to follow or break rules when their perceived incentives change (Vriend 1996). Hypothetically, if an individual sticks to rules regardless of the changing situations, such as the *commitment* proposed in Sen (1977), economists can do nothing but treat these rules as a given behavioural constraint, which does not differ in nature from the conventional budgetary constraint. On the contrary, it seems more likely in practice

that an individual breaks rules when incentives for doing so become strong enough. It is a straightforward indication that both the benefits derived from following a certain rule and from breaking it are measured by a common metric [7]. In that case, the problem of rule-following is reduced to the subject of a rational choice model about cost-benefit analysis.

Fourthly, the exclusive concentration of economists on the rational aspect of human conduct is neither from the need for simplification, nor from the need for realism. Instead, it is simply a result of the division of theoretical labour, since every discipline has its subject matter and/or defining features which are taken for granted at the very beginning. For example, most people would agree: that 'how to prove the theorem of Pythagoras' is not subject to economic explanation; that the question of why biology is a science of life and living organisms is beyond the scope of biology. Nevertheless, the argument of the division of theoretical labour should not be interpreted as a claim that economists should always take preferences, tastes, and other moral elements of economic agents as given, or, to borrow Boulding's (1969) words, 'immaculately conceived', and then only be concerned with their consequences (Hausman 2012, Chapter 6). Indeed, according to the rationality principle explained above, the formation of a specific kind of preference/taste/value also has its rational aspect and thus should be viewed in the eyes of economists, as an outcome of another framework of rationality, with some preference structure and behavioural constraints given beforehand. In theory, this endeavour might regress infinitely; in practice, where we stop — or where we start — depends on the purpose of a specific research agenda. Importantly, it is under the rationality principle that some major advances have been achieved in explaining preference formation *within* the discipline of economics, such as Stigler and Becker (1977) and Becker (1996). For example, in the latter book (Chapter 3), Becker provides insight into addictive behaviour by proposing a framework of utility maximization extended to incorporate the idea of 'consumption capital' (roughly, stock of past consumption).

Fifthly and lastly, understanding the rationality principle also sheds lights on the *revealed preference theory*, which concerns about how to define utility function and thus is central to mainstream economics. Always in light of the rationality principle, the preferences, as seen by economists, can be revealed by choice as long as the constraints on the choice can be neutralized. Here, it is compelling to mention a book on preference and choice written by Daniel Hausman, a prominent figure in philosophy of economics. In this book, he advances two arguments against our claim that preferences is defined in terms of choices (2012, Chapter 3). First,

as Hausman put it, such a claim implies that 'where there is no choice, there is no preference' (2012, p. 27) and thus it is untenable. Although agreeing with him if this implication is taken in general, we object to his point if preference is considered within the scope of economics: if economic agents face no choice, there is no room nor need for economic inquiry. And then, the notion of preference here does not make any sense for economists. Let imagine that if an individual takes good A since he/she has no other choice (including the choice to not take it), then what can be expected from an economic inquiry about this *behaviour*? The second counterargument Hausman proposed against the claim that the preferences can be defined by choice is that 'because the same choice reflects different preferences when beliefs differ' (2012, p. 27). Again, this objection seems problematic since when defining preferences by choice, it is quite obvious that the constraint side of the behaviour in question, including the available information upon which the belief is based, has to be neutralized. Importantly, it does not differ in nature from the logic that when considering the preference of an individual between good A or B, one should keep their prices equal.

'Ought entails can': from the nature to the task of economics

Importantly, viewing economics as a study of the rational aspect of behaviour is not a matter of name. In fact, the key issue at stake is about the *real definition* rather than the *nominal definition* of economics. The former refers to the inquiry of the nature of the *definiendum*, economics, while the latter, which is related to names, is not the object of our interest (see Kirzner 1960, p. 4-5). After all, as Shakespeare's Juliet recites in her famous line, 'a rose by any other name would smell as sweet!' In saying this, exploring the nature of economics is then tantamount to an inquiry into the common features found in 'what economists actually do', no matter which specific perspective they take — such as the neoclassical or behavioural paradigm — when researching human conduct in market exchanges, marriage, crime, addiction, and so forth.

Indeed, our inquiry into the nature and epistemological limits of economics is by no means a pure intellectual exercise. Instead, in the light of the thesis that 'ought entails can', knowing what economists can do paves the way for exploring what economists ought to do. The latter question essentially implies the role of economics in advancing the understanding of human behaviour and its use for real world decision-making.

On the one hand, as a descriptive science, by pushing the maximization logic to its limits, economics may help to gain insights into some driving forces underlying human behaviour of all kinds. Here we can consider three examples. First, within the traditional intellectual territory of the subject, namely the production and distribution of wealth and the associated market relationship, the application of the economic approach has progressed greatly in the sense that a growing number of variables, previously assumed to be *exogenous*, have come to be put under investigation within the maximizing framework. Or, in the terminology of the modern economic theory, they have been *endogenized*. Probably the most compelling and well-known example in macroeconomics would be the manner of dealing with technological change. In the Solow-Swan model developed in the 1950s, the variable was taken as an exogenous determinant of long-run economic growth, while in the *endogenous* growth theory which emerged in the 1980s, it has become endogenously determined by the choices of rational economic agents, namely consumption-maximizing consumers and profit-maximizing producers (for a more detailed discussion, see Barro and Sala-i-Martin 2004).

Another example of the progress in economics lies in the so-called *economic imperialism*. Under this heading, an increasing body of literature, mainly pioneered by Gary Becker (1976, 1996), has attempted to apply the economic approach to issues previously deemed to be outside the realm of economics, such as addiction (see above), marriage, crime, discriminatory tastes, language choice and so forth. Therefore, by crossing boundaries, this line of research offers new insights into the interrelation between economics and other disciplines: The principal duty of the practitioners of economic imperialism is to show the outcome of a given maximizing framework, and then to call for the expertise of psychologists, sociologists, anthropologists, philosophers, biologists, and many others, who, hopefully, can bring new insights into the objective function and behavioural constraints involved in the process of choice making. From this viewpoint, despite its 'imperialist' expansion, economics is also likely to be a kind of 'colony' of other subjects.

That leads to our third and perhaps more staggering example which just comes from an important rival to the mainstream model of rational choice, the behavioural approach to human conduct. Specifically, in a series of papers devoted to decisions under risk, Kahneman and Tversky — two leading figures in this research line — document some behavioural anomalies and cognitive biases, such as the *Allais Paradox* (Allais, 1953, Kahneman and Tversky 1979). When they simply report their experimental findings, economics is not on the stage yet. More specifically, if

they just close their paper by showing that there is a X percentage of people choose 450 (units of money) for sure, rather than 1000 for 50% chance or 0 for 50% chance (see the question shown in Kahneman and Tversky 1979, p. 264), then most should agree that an economic analysis, in its usual sense, has not been proposed yet. However, when they further attempt to explain and understand the experimental findings by introducing some well-behaved functions of psychological value, which might be affected by some psychological mechanisms such as the *certainty effect*, a new but somehow disguised model of maximization has been forming and thus economic analysis appears. This example clearly shows that economics and psychology inspire each other and make progress hand in hand.

On the other hand, economics also plays a more direct role in changing the world. As a prescriptive or policy science, the subject would contribute to improving the real-life decision-making *if and only if* its theoretical statements and empirical findings are capable of influencing the means and end of the decision makers in question, namely the empirical content of the latter's rationality. Importantly, it is a matter of logic that since in the eyes of economists, behaviour is merely defined by means-end consideration, thus it cannot be changed unless either means or end or both are changed. In this regard, the one-shot prisoner's dilemma provides a good example: other things being equal, it is impossible for economists to improve the outcome of the game (a lesser charge for each) if the utility function of and the constraints facing the prisoners remain unchanged, even after their strategies have been fully explained: say, if they stay rational in the sense that each cares only about his/her own sentence and has neither sympathy for nor sense of commitment to the accomplice [8]. In such a context, what economists can do in a prescriptive stance is to effectively communicate their inquiry to the prisoners to the extent that the latter's values, tastes, information set, moral and other behavioural constraints can be changed to attain the better outcome. From this viewpoint, economics is reduced to an essay in persuasion, or a kind of preaching. Accordingly, there seems to be no reason to expect a *silver bullet*, or a genius discovery as a simple guaranteed solution for a dilemma from mere economic theory. To some degree, it can also explain why economics, as many see it, has only limited influence on the real-life state of economy. For example, in comprehensively discussing the history of the United States trade policy, Irwin concludes that the ideas of economists about international trade 'have not had much influence in shaping policy outcomes throughout history' (2017, p. 27; also see Frey (2006) for influence of economics in general context). Thus, very often, economists need to stress, to restate, to spread their claims, and to pay more attention to their rhetoric. In short, their success

in practice depends mainly upon their persuasion and communication skills (see McCloskey 1985, and Stigler 1980).

Concluding remarks

As a result of the division of theoretical labour, economics occupies itself exclusively with a certain aspect of human behaviour, the rational aspect, which can, at least in principle, be detected and represented through some constrained maximization framework. Importantly, this is a fundamental methodological cornerstone of economics which different theoretical perspectives, ranging from neoclassical economics to behavioural approach, rely upon explicitly or implicitly.

In our view, this rationality principle that defines the nature of economics, is understood by drawing a conceptual distinction between *theoretical rationality* and *empirical rationality*. The former is stripped of all empirical supports and attributes, and then merely establishes the pure form of thought for economists; the latter, however, provides economists with the object of thought and thus makes economic inquiry empirically relevant. Confusion between the two notions of rationality leads to misleading criticisms of the scope of economics, such as the *too-narrow* and *too-broad* views.

Turning to the task of economics, although there seems to be nothing new in claiming that economics is useful in terms of both description and prescription, unlike existing studies, we discuss the twofold task of the subject in relation to its nature as a rational apparatus. That is to say economists can only do what the apparatus enables them to do and nothing else. Logically, the subject should reach its limits at some point where other disciplines start, and thus, it is by no means an all-encompassing approach to human conduct. Or, to borrow the words of Wittgenstein (1961), economists cannot *speak* about everything and thus must stay *silent* at some point.

There is, however, an important caveat. Defining the epistemological limitations and scope of economics does not give economists reason to be complacent or shirk their responsibility. In particular, economists should not rush to attribute some phenomenon to the irrationality of people, and thus conclude it is nothing to do with their discipline. This kind of methodological attitude has long been criticized, especially by those who engage in the imperialist expansion of economics, such as Becker who argues: 'When an apparently profitable opportunity... is not exploited,

the economic approach does not take refuge in assertions about irrationality... Rather it postulates the existence of costs, monetary or psychic, of taking advantage of these opportunities that eliminate their profitability-costs that may not be easily "seen" by outside observers' (1976, p. 7). In a certain sense, the dismal science can be viewed as an endless intellectual effort to search for where economists cannot speak.

Unfortunately, in the recent methodological discussions in the wake of 2008 GFC, the very nature of economics does not attract much attention. In particular, the task and use of economics have been discussed without a critical examination of the fundamental characteristics and epistemological limitations of the subject. As a matter of fact, when undertaking their rethinking, many still focus on the realism of the central hypotheses of neoclassical theory on the one hand, and on the relation between market and government, which is basically derived from the first, on the other hand (see, for example, Posner 2009, Krugman 2009, Stiglitz 2010, and Coyle 2012). By and large, in repeating some overfamiliar ideas, some base their arguments upon a confusion between the *a priori* theoretical abstraction of economics and its specific empirical content. More importantly, such a misunderstanding appears to be pervasive and widely shared by both the proponents and opponents of the neoclassical paradigm. For example, to defend the dismal science, Robert Lucas still underlies the empirical accuracy of the efficient market hypothesis (Lucas 2009). With all due respect, one can easily notice a surprisingly narrow-minded methodological attitude embodied in his defence, where the theoretical development and empirical findings of the non-neoclassical heterodox schools during the last decades are almost entirely disregarded. By contrast, Dan Ariely declares 'the end of rational economics' and then advocates the behavioural economics approach (Ariely 2009). However, in the spirit of the two-faceted economic rationality developed in the current paper, the ultimate ending of rational economics is impossible because it is exactly the same as the ending of economics per se. Instead, what economists can do, including Professor Ariely himself *qua* economist, is to put an end to a specific version of the rational model, and, simultaneously, to replace it with another rational model but equipped with different empirical content.

Finally, in a broader view, economists should benefit from occasionally distancing themselves from choices of hypotheses, regression techniques, dynamic approaches, policy analysis and other daily concerns, in order to tackle more fundamental methodological issues, which play crucial roles both in the theoretical development and practical performance of the discipline. To borrow an analogy from Buchanan

(1964), sometimes we have to stop driving for a moment and look at the road map before or soon after getting lost. It is, however, hard to imagine that such a scientific task can be achieved with the very nature and limits of the subject left untouched. In particular, given the ferocious severity of the current dual crisis of the economy and economics, there is no doubt that more vigorous efforts are needed to thoroughly revisit the general picture of the dismal science and to boldly confront the intellectual challenge offered by the Ancient Greeks: 'Know thyself!'

Endnotes

[1] See <https://www.theguardian.com/business/2008/oct/24/economics-crediterrunch-federal-reserve-greenspan>.

[2] However, this point should be taken as long as we stay within the scope of economics. See Munda (2016) and Li (2019) for further accounts on the (in) commensurability of ends.

[3] Notably, as Boland (1981) argues, the maximization hypothesis is a metaphysical statement which is beyond question in the neoclassical theory. In our view, however, this statement can be extended to the entire research programme of economics.

[4] In practice, the inquiry of this kind has been done either explicitly or implicitly, and thus does not necessarily draw on mathematical optimization.

[5] In this regard, it is noteworthy that the central message of the *bounded rationality* – a term coined by Herbert Simon (1955), is to broaden the set of constraints to include the factors mentioned in the text, which are rarely considered in the neoclassical scheme. However, taking *constraints* in their broader sense, the claim that rationality is bounded is *exactly equivalent* to the claim that maximization is subject to constraints.

[6] For example, one may just end a paper by reporting that there is x percentage of players who refuse positive offers in the *Ultimatum Game*. However, such work is extremely rare in the relevant literature, and even it exists, most people will consider it a preliminary step of a full-blown research project.

[7] These benefits from following rules may include a broad range of factors, such as avoiding punishment, simplifying the decision process, and even the pure contentment from following rules.

[8] Following Sen (1977), here, by *sympathy* we mean that the lesser charge for the accomplice makes the player personally happier; by 'commitment' we mean that even though the charge of others does not affect the player's own welfare, the latter still stays faithful to the accomplice because he/she believes that it is right thing to do.

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