

Chapter 9

Between Individual and Collective Rationality



Anna Horodecka and Liudmyla Vozna

Abstract The paper raises the question of irreducibility of collective rationality to individual rationality. The irreducibility of collective rationality to individual rationality is explained by the phenomenon of complexity and complex character of human nature. Taking the complexity theory approach to the analysis of institutions, it discusses the question of dependency of individual rationality on collective rationality. It is asserted that collective rationality emerges not merely from the human capacity for rational reasoning but from a variety of other human capabilities which influence the formation and functioning of socioeconomic institutions. Institutions, in turn, are understood here to be a specific embodiment of collective rationality.

9.1 Introduction

The concept of rationality is one of the fundamental and most controversial elements of economic theory. Since the rationality assumption forms the basis of many, primarily mainstream, macroeconomic models, it influences macroeconomic policy. Thus theories of rationality can have far-reaching effects on economic reality.

Generally speaking, economic rationality is associated with optimisation and efficiency. In modern economics, the concept of rationality is primarily related to the neoclassical doctrine which focuses on the behaviour of individuals (consumers, firms) and assumes that their rational strategy consists in the maximization of their expected subjective utility. This is exactly a core of the mainstream theory of rational choice, which is also associated with positivism, instrumentalism and methodological individualism. However, despite the popularity of the neoclassical approach, the concept of rationality has been approached from various angles and, in the literature, one can find various definitions and classifications of rationality. For example, Herbert Simon (1955) made an important distinction between “substantive

A. Horodecka (✉)

Department of Economics (Collegium of Economic Analysis), Warsaw School of Economics, Warsaw, Poland

L. Vozna

Independent researcher, Zhytomyr, Ukraine

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rationality” and “procedural rationality”, paying special attention to the latter. Other authors distinguish between methodological and material (or between formal and practical) rationalities. In the analytical sense, the definition of rationality has two components: the first one concerns the rational choice of goals, and the second one – the means to realize the goals.¹ In addition to that, some leading economists, notably Vernon Smith (2008), distinguish constructivist and ecological forms of rationality.

The list of other possible classifications can be continued. Since the economic system as a complex system consists of many different levels (e.g., micro-level, meso-level, macro-level), it makes sense to consider a specific hierarchy of different rationalities. These differences are determined by the goal pursued by a system under consideration, the level of a system (from individual to meta level), the time and space criteria. In this hierarchy, neoclassical rationality occupies only one of the places and, at the same time, can diverge from other types of rationality. For example, imagine a community of people which in order to survive in the short-term, in accordance with neoclassical rationality, harvests a forest for immediate sale. However, in the long-term, deforestation can cause such changes in the ecosystem (such as the problem of floods), which can then endanger further existence of this community and the costs associated with these consequences far outweigh the benefits realised from the harvesting. This example demonstrates both the contradiction between the short-term and long-term rationalities, and the inconsistency that is possible between individual and collective rationalities. The choice that seems to be rational from the individual point of view can be irrational from the standpoint of collective choice, and vice versa.

Using the simplistic understanding of rationality, we risk failing to explain the more complex phenomena such as, for example, the functioning of some fundamental social institutions, which are associated with collective rationality. The goal of the article is to demonstrate the irreducibility of collective rationality to individual rationality. Also, using the complexity theory approach, we raise the question of the dependency of individual rationality on collective rationality, i.e. we assert that the former is conditioned by the latter rather than vice versa. Alan Kirman, one of the leading specialists in complexity economics, makes a similar assumption when he writes that “it is the type of organization rather than the individual behavior that is central to achieving coordination. Once in place, the organizational structure, itself, coordinates individual activities and makes them consistent” (2010, 6).

One of the key problems addressed here concerns the question of the influence of human emotions on rational decision-making. For explaining collective rationality, if we start from individual rationality, which implies decision-making is based on a conscious (calculated) choice, we inevitably lose the emotional component of human behaviour. However, some human emotions (such as affection, confidence, curiosity, despair, fear, pride, empathy, trust, and others) play an important role in the formation of social values and the functioning of a number of social institutions.

¹ See, for example, Hogan and Marcelle (2017).

Institutions, in turn, are understood here to be a specific embodiment of collective rationality. Therefore, it is assumed that collective rationality inevitably contains a component of human emotions, and the irreducibility of collective rationality to individual rationality is also explained by the constitutive factors of complexity determined by human nature.

9.2 The Problem of Irreducibility of Collective Rationality to Individual Rationality

One of the basic premises of rational choice theory is that aggregate social behaviour results from the behaviour of individual actors, each of whom makes their individual decisions. A central concept in this theory is the principle of transitivity and the aggregation of individual preferences as a mode to define a collective, social (rational) choice. The principle of transitivity is fundamental in the ordinal utility theory and it orders the preferences of an economic agent on an ordinal scale. It means that if a consumer (economic agent) deciding between any three goods (outcomes, choice options) X, Y, and Z, prefers X to Y and Y to Z, he must prefer X to Z. This principle is considered to be an important feature of the rational behaviour of economic agent as the transitivity principle relates to the laws of logic.

Such a view of rationality is also strictly connected with the understanding of economics as a positivist science, i.e. free from subjective judgements and values. Researchers point out that early neoclassical economists “still had traces of the old honorable concern of the classical writers, like Adam Smith, for the well-being of society” (Walsh 2007), and it was Lionel Robbins who, in the 1930s, played an important role in the transformation of neoclassical economics into the science of instrumental rationality that is “value free” and related with a choice of (scarce) means for the reaching (alternative) purposes (ends) (Cedrini and Novarese 2014). Vivian Walsh (2007, 64), in particular, notes that this methodological shift occurred not without the influence of logical positivism, still popular at the time, and “the positivist claim that there was a sharp dichotomy between matters of fact (the domain of science) and values”.

Yet, by following the transitivity principle to determine collective choice we risk coming to paradoxical conclusions. In fact, the Arrow’s impossibility theorem, which considers voting systems, and the prisoner’s dilemma demonstrate the very problem of conversion of individual preferences into desirable community-wide acts of choice. As Amartya Sen remarks, internal consistency of choice “is essentially confused, and there is no way of determining whether a choice function is consistent or not without referring to something external to choice behavior (such as objectives, values, or norms)” (2002, 122).

Also, in line with methodological individualism, choices made on the basis of individual rationality lead to the best possible allocation of resources, so they are the guarantors of systemic rationality understood as macroeconomic rationality. In

other words, market outcomes, such as equilibrium or allocative efficiency are results of individual behaviour of agents who are rational maximisers of their utility (profits). In this vein, macroeconomic rationality is associated with the Pareto optimum state, under which the situation of one of the market participants cannot be improved without worsening the situation of others.

However, this assertion is not supported by empirical data and, in particular, by experimental economics. For example, on the basis of laboratory experiments with the use of computer simulations, Shyam Sunder (2002) concluded that “weak form of individual rationality, far short of maximization, when combined with appropriate market institutions, can be sufficient for the market outcomes to approach the predictions of the first fundamental theorem” (according to this theorem, under certain idealized conditions, any competitive equilibrium leads to a Pareto efficient allocation of resources), and that “markets can exhibit elements of rationality absent in economic agents”. (Rationality of markets relates here in particular to the efficiency of markets, namely their ability to allocate the limited amounts of resources in a way that maximizes the satisfaction of consumers.)

Similarly, Alan Kirman challenges the approach, according to which “if we start with well-behaved individuals we will obtain well behaved aggregates” and “well behaved individuals have nicely structured behavior derived from their optimizing behavior” (Kirman 2010, 20). Using the example of the fish markets, he demonstrates that the behavioural “regularity” is more apparent at the aggregate than at the individual level. In general, in his opinion, the relationship between the behaviour of the individual participants and the market as a whole is mediated by the way in which the market is organized, i.e. the way in which the market allocates resources depends on the type of market institution (Kirman 2010, 60–66).

9.3 The Bounded Rationality Versus the Variety of Human Nature

To explain the above-introduced problem of irreducibility, it is important to at least consider the following three questions. First, individuals are not rational in the neo-classical sense. Second, even if individuals do not behave rationally in the neo-classical sense, they can reach goals that are rational. Third, the rational behaviour of individuals can lead to irrational outcomes.

9.3.1 Individuals Are Not Rational in the Neoclassical Sense

One of the features of basic neoclassical models, such as the consumer behaviour models that use the indifference curves and budget lines (elaborated by F. Edgeworth, E. Slutsky, J. Hicks), is the implicit assumption about a consumer who has perfect

information. In other words, a consumer, maximizing utility and choosing a combination of the two goods (for example the cups of coffee and the pieces of cake), knows perfectly in advance the taste of these goods, his future pleasure from their consumption and so on. It seems plausible that, if a consumer, performs the same actions regularly, is devoid of the spirit of experimentation or (and) the ability to cognize the new, it is easier for him to comprehend his expected cumulative utility. However, if our consumer decides to sacrifice additional cups of coffee in the name of an additional unit of a product, which is absolutely new for him, he takes a very serious risk of disappointment. Thus, such models are actually static.

The assumption of perfect information is also implicitly linked to the assumption of the availability of time, sufficient to make the best decision. For example, in the case considered here, the consumer needs to have enough time to collect (obtain) the necessary information for making the optimal decision. Such a period of time can extend also into the past, forming sufficient experience for making decisions in the future. On the one hand, if the consumer makes a decision very quickly and does not have the necessary information at the same time, i.e. irrationally, he risks making a choice which can be illustrated as a point remote from the point that corresponds to the maximum utility (equilibrium point). On the other hand, if our consumer has an infinitely long time to exercise his best choice, he runs the risk of repeating the fate of the Buridan's ass: failing to choose between two identical piles of hay, the poor animal eventually dies of hunger. Therefore, from the point of view of the dynamics and viability of the economic agent, it should be better for him to consume less utility but be at the right time than in an effort to maximize the utility lose it altogether.

The best-known criticism of the neoclassical concept of rationality came from behavioural economists especially from Herbert Simon whose new concept of bounded rationality refers to the limited human ability to process information (resulting, among others, from the lack of time, attention and ability to concentrate). In particular, Herbert Simon critically refers to the understanding of self-interest as the most important goal and to the way of understanding rationality as a choice of preferred alternatives of action by means of a system of values enabling assessment of the results of activities.² His criticism refers to the realism of the assumption about full knowledge of a person about possible alternatives, as well as the physical possibility of his/her mind to process this information and the willingness to make such an assessment. For this reason, individual decision-making behaviour does not follow from a calculation of all variants and the selection of the optimal, but from the available values and criteria, which are considered by the subject as the basis for selection. The lack of realism of neoclassical assumptions manifests itself also in the fact that, for example, for a neoclassical rational man it would be rational to violate social rules (if it does not involve costs), but people often refrain from doing so. So, according to Herbert Simon, rationality of decision-making in the neoclassical sense is not possible. In place of neoclassical rationality, he proposes

²See, for example, Simon (1997).

the concept of bounded rationality, which accounts for a rational choice that takes into account the cognitive limitations of both knowledge and cognitive capacity. Simon (1997) emphasizes the important role of habit, which allows for the economical use of spiritual and mental efforts.

The view that “the economy is not just governed by rational actors” and “much economic activity is governed by *animal spirits*” (i.e. people have noneconomic motives), was already expressed by John Maynard Keynes in his *The General Theory* (1936). Referring to Keynes, George Akerlof and Robert Shiller, in their book *Animal Spirits* (Akerlof and Shiller 2009) have provided a detailed illustration of this idea. In particular, they demonstrate that, in making significant investment decisions, economic actors often don’t behave according to prescriptions of standard economic theory. The latter, in turn, asserts that, for making rational decisions, people consider all the options available to them, consider the outcomes of all these options and how advantageous each outcome would be, consider the probabilities of each of these options, and then they make a decision (Akerlof and Shiller 2009, 13). However, under conditions of uncertainty, it is impossible to define precisely those options and probabilities. So in reality people do not act rationally but act according to what they trust to be true (rational). This also means that the decisions of economic actors depend largely on their beliefs and trust. Akerlof and Shiller emphasise the large role of confidence, for example, in the growth or decline of credit markets, and remark that the meaning of a term *confidence* goes beyond the rational and it is related with human feelings or, in other words, “animal spirits”.

9.3.2 *The Behaviour That Seems Irrational Can Lead to Rational Results*

Behavioural economists, such as e.g. Gerd Gigerenzer, Daniel Kahneman, Amos Tversky and many others, point to the role of techniques, different from logical reasoning, which help people to solve problems and make the best decisions quickly. They emphasize the role of effort and time which a person must devote to rational analysis. Mental activity is associated with a high-energy consumption (the brain absorbs the most energy), so people, aiming at minimizing energy expenditure, apply heuristics – so-called “quick” thinking instead of logically analysing the problem (“slow” thinking), which claims less costs (calculated by time and effort).³ Heuristic is a technique associated with a simplified way of thinking, a simple way to make a conclusion without resorting to mathematical calculations or scientific thinking. As Gerd Gigerenzer (2008, 20) underlines, “unlike statistical optimization procedures, heuristics do not try to optimize (i.e., find the best solution), but rather satisfice (i.e., find a good-enough solution)”; the models of heuristic cognition focus on situations in which people need to act fast. There are many heuristics, such as

³ Kahneman (2012).

e.g. a rule of thumb, trial and error method, “imitate the majority”, “imitate the successful” and so on. Daniel Kahneman (2012) discusses particularly the availability heuristics, heuristics of representativeness (used in the situation of assessing statements referring to probabilities) and heuristics of anchor and matching (it is used for the quantity evaluation). People use different heuristics depending on the situation and environment, and the same heuristic can be successful or not depending on the circumstances. In general, the use of heuristics can be explained by a diversity of human capabilities. As Gigerenzer notes, “without the evolved capacities, heuristics could not do their job”. Among other examples he mentions the human capacity for recognition memory (such as face, voice, and name recognition), the capacity to imitate and the evolved capacity for reciprocal altruism (2008, 25).

It can be seen that the heuristics method is connected with human abilities that go beyond the limits of conscious activity, and reveals the richness of human nature, an important part of which consists of emotions (sympathy, antipathy, affection, fear, confidence and so on). In particular, with regard to long-term rationality, the emotional part of human nature is sometimes capable to challenge the boundaries of individual rationality based on hedonistic understanding of maximization utility. As an illustration imagine a greedy man who tries to “row for himself,” i.e. to take more from other people than to give them. In the end, he risks losing friends and their possible support in case of need, etc. A rational person, who is capable of understanding the far-reaching consequences of his actions, can consciously be generous toward his friends (i.e. “invest” in his friends). These are two different motives for behaviour, but here it is possible to see how the specifically human needs and capacities (the need for friendship, the ability to be generous and kind) may on the outside be compared to the behaviour of a man whose rationality extends over a long period of time.

In the same vein, we can perceive the relation of human beings to the natural environment. Aside from people who do not pollute the natural environment only because there are external (public) prohibitions or because of pure economic reasons (in accordance with a logic of economic imperialists), there are people who do not pollute and do not damage nature because they feel affection for it and regard it as a living being. Therefore, the human love of nature contributes to the long-term preservation of the natural habitat, much like the rational actions based on the complex mathematical calculation of the future consequences of the present damage of nature would.

There are many other examples like this, e.g. in the realm of education and the investment in human capital, the creation of family, pension contributions, etc. But all of them in one way or another demonstrate that the bounded rationality and bounded human nature (in the sense of poverty of a human nature) converge at a certain point. In other words, the diversity of human nature compensates the limitations of human mind related to the lack of information and the inability to make long-term calculations. It seems in fact that to some extent, the rational and emotional parts of human nature substitute and enhance each other.

The Rational Behaviour of Individuals Can Lead to Irrational Outcomes In their book mentioned above, Akerlof and Shiller describe situations when, as it happened before the Recession of 2001 and the Great Recession of 2007–2008, individuals in financial markets behaved in accordance with the theory of rational choice, as they were following their own self-interests (2009, 35). However, since they invested in risky financial assets, their “rationality” did not lead to a macroeconomic equilibrium, but to speculative bubbles and eventually to a financial crisis. Therefore, in the end, their behaviour was not rational from the perspective of the economy as whole, and eventually from the perspective of the “rational” investors themselves.

9.4 Information, Complexity and the Principle of Emergence

Is a donkey rational, going after the carrot which is hanging on a stick in front of his muzzle? Having seen a carrot, a donkey theoretically can have a reason to take a step toward it. It can theoretically take a few more steps. We cannot call irrational the first steps of the animal, because the donkey is driven by hope, optimism and the absence of experience. If the donkey is stubborn in its hope, then we can call him the Donkey. The general conclusion of this example: the economic subject behaves irrationally, when he does not use (he does not try to use) accumulated experience. In other words, he does not accumulate information (his information resource equals zero), does not use it, i.e. does not learn and is characterized by (perfect) ignorance. In this example, the problem of bounded rationality, as it has been formulated by Simon, is not so much the problem of limited information (the static problem) but it must be connected with the problem of accumulation of information and the process of learning (dynamic context).

Accumulation (conservation and transmission) of information is a characteristic of complex systems. Complexity can also be defined by other considerations, including those of time and space. The economic system with a shorter lifetime is simpler in comparison with a relevant system with a longer lifetime. Thus, rationality associated with a short time utility maximization must be characterized as atomistic and also must be a characteristic of a very simple (socioeconomic) system. Since the length of time in question is connected with complexity, it is not accidental that, for example, in experimental economics the results for one-shot games (compare them with a short-term system) differ from results for repeated games (compare them with a more complex long-time system). Namely, according to the principal findings of experimental economics, in repeated personal, social, and economic exchange, as studied in two-person games, cooperation exceeds the prediction of traditional game theory (Smith 2008). In light of the foregoing, since a socioeconomic system has a high level of complexity and, correspondingly, of diversity and heterogeneity, one of possible answers on the question about irreducibility of macro (systemic) rationality toward individual one, may lie in the principle of emergence. The latter, in turn, means that “the whole is greater than the sum of its parts”, i.e. that a complex system as an entity demonstrates properties that are

absent in the constituents of the system, due to interactions among these constituent parts.

Furthermore, assuming the connection between rationality and information ability of a system, and also considering a bigger information ability of a more complex system, we can suppose that individual rationality is determined by collective rationality rather than a system (collective) rationality is being determined by the individual one. In general, it is consonant with the fact that a human as a reasonable being is possible only as a product of society (“social animal”). As Friedrich Hayek wrote, “[The] interaction of individuals, possessing different knowledge and different views, is what constitutes the life of thought. The growth of reason is a social process based on the existence of such differences” (Hodgson 2015, 292).

It is also consonant with the thesis (the result of research) that biological species with a high level of cooperation have a greater propensity to learn, adapt, survive, and, in general, to evolutionary development. The researchers point out that the cultural evolutionary process depends crucially on the size and interconnectedness of our populations and social networks; it is the ability to freely exchange information that accelerates adaptive cultural evolution, and creates innovation, and, at the population level, it is much better to be social than to be smart (Henrich 2015).

In other words, among other things, the rationality of individuals depends on their ability to learn from each other and from experience (to use accumulated information). Such a view seems to be similar to the approach of evolutionary and complexity economics. In particular, Alan Kirman remarks that, in markets, “the habits and relationships that people have developed over time seem to correspond much more to things learnt by the force of experience rather than to conscious calculation”, and an attribution of rationality of the agents, when they are electing a strategy, is that “they are more likely to do what has proved to be successful in the past” (2010, 92, 85).

The inspiring examples of the superiority of collective rationality over individual rationality are given by natural sciences, in particular by behavioural ecology. For example, according to the research of Susan Edwards and Stephen Pratt, ant colonies can avoid irrational changes in preference that can be shown by individual animals and humans (Williams 2009). Edward and Pratt tested for irrationality in colonies of *Temnothorax* ants choosing between two nest sites that varied in attributes, such that neither nest site was clearly superior. In similar situations, individual animals show irrational changes in preference when a third relatively unattractive option is introduced. These societies act as unitary decision-makers, able to jointly select a single travel direction, foraging location or nest site from many options. Detailed analysis of this species has shown how consensus depends on a minority of active ants that scout for potential homes and assess their quality. Problem solving by insect societies relies on highly decentralized information processing. This partly reflects cognitive and information-processing constraints: individual insects cannot handle these problems alone, and colonies lack the hierarchical structures that might foster centralized decision-making. The results of this study support another advantage: the filtering out of systemic errors that would otherwise arise from the cognitive limitations of individual animals.

The example with ants echoes Hayek's idea cited by a number of well-known economists⁴ according to whom the information in the economy remains dispersed and is never brought together into signals available to everyone:

The problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess". "The whole acts as one market, not because any of its members survey the whole field, but because their limited individual fields of vision sufficiently overlap so that through many intermediaries the relevant information is communicated to all (1945, 519; 526).

One of the main features of a complex system is diversity, which, in turn, is related with information capability of a system. So, first, according to the information theory, the homogeneous structure is characterized by zero information. Second, according to W. Ross Ashby's law of requisite variety, to be able to resist variable unpredictable impacts of the external environment and thus to be conserved, the open system must have the requisite variety and complexity of its internal structure; only variety absorbs variety.

To sum up, on the one hand, if a social system consists primarily of "atoms" (i.e. selfish maximisers), its collective rationality is more reducible to atomistic rationality and, at the same time, such a system is more mechanistic, very vulnerable to external factors (sources of energy), and less enduring. On the other hand, in the case of a weak reducibility (or irreducibility) of systemic rationality to individual one, the system under consideration is more complex, it is characterized by more information capacity and diversity, and is more enduring.

9.5 Complexity and Institutions: Institutions as the Embodiment of Collective Rationality

An example of the influence of collective rationality on individual rationality can be the role that is played by institutions and norms. After all, in socioeconomic systems, it is institutions and culture that fulfil the function of preservation and conservation of information, i.e. they serve as the fundamental carriers and transmitters of information. Just as a human body "knows" how to function due to the information contained at the level of genes (genetic code), human beings often know what to do because they follow the norms and rules established in a society.

The link between institutions and information is emphasized by a number of prominent economists. For example, in the opinion of Douglass North (1991), institutions are formed to reduce uncertainty in human exchange with the help of structuring everyday life; they serve as indicators for human interactions; under conditions of incomplete information and imperfect computing capabilities,

⁴See, for example, Hodgson (2015, 292), Kirman (2010, 12), Smith (2008).

(institutional) constraints reduce costs of human interaction in comparison with the absence of institutions; in a world of instrumental rationality and complete information institutions are unnecessary. Also Geoffrey Hodgson (1988) points to the informative role of institutions and routines, in particular, when he writes that institutions really create and broadly disseminate additional information already by the very fact of their existence.

To better understand how institutions and rules predetermine the individual rationality, let us consider the following thought experiment. Imagine a magical external observer who watches people crossing the road. Let us also assume that he does not see the traffic lights (and does not know about their existence). And assume that there are no violators of the traffic rules. Let us consider the two following scenarios: first, when the traffic light works and, the second, when the traffic light does not work. So, in the first case, our observer can see the perfect order and think about perfect rationality of the both pedestrians and drivers: the pedestrians are rational, because they cross the road when the cars stand; the drivers are rational, because they stop when pedestrians cross the road. In the second case, however, the picture changes and becomes more chaotic: people can cross the street even when vehicles are moving; the cars can continue to drive even when people are crossing the road. Therefore, our magical observer can conclude that pedestrians as well as drivers became less rational. Is it really the case? In their own eyes, the pedestrians conserved both: a goal (end) – to cross a road, and a means – a wish to conserve their lives avoiding cars. The drivers conserved their goal to continue their way and the movement, avoiding pedestrians. In other words, their individual rationality did not change (or changed slightly). But something happened with the general system of rules, and the participants of the process under consideration were disoriented.

This thought experiment demonstrates, first, that individual rationality is not identical with collective rationality, and, second, that rationality of individual behaviour depends on the system of rules in a society. In other words, we can take pedestrians and drivers to represent economic actors, and a traffic light can be thought a representative of institutions, rules and routines dominating in the system under consideration. But, as Richard Langlois (1998) remarks, “economic choice as we normally think of it can happen only in a stable and predictable world in which most of the cognitive load is being carried by rules and routines”. So the change or the damage of old institutions and rules influence the character of individual choice, which under conditions of growing uncertainty seems to become less rational.

It is a commonplace fact that culture, norms and institutions influence, for example, the tastes and, thus, decisions of consumers. Similarly, the institutional environment influences investment decisions. It is noteworthy that Akerlof and Shiller, pointing out the weak sides of the conventional theories of saving (which are constructed around the assumption about individual rationality), remark that “saving is largely cued by different institutional and mental frames” (2009, 123) and, in particular, give examples of the big differences in savings between China and United States, which are connected to institutional and cultural differences.

Actually, the phenomenon of individual rationality under the influence of the institutional environment is described by the concept of ecological rationality. The

term of ecological rationality was coined by Gerd Gigerenzer (2008) and it is also used by Vernon Smith, the main creator of experimental economics, who considers that there are two types of rationality – constructivist and ecological, which coexist and complement each other. The concept of constructivist rationality is associated with the conscious deductive process of human reason, and the use of reason to deliberately create rules of action, and to create human socioeconomic institutions. Exactly this type of rationality is close to the understanding of rationality by neo-classical economics. The ecological rationality, in turn, is associated with intelligence embodied in the rules, norms and institutions of our cultural and biological heritage that are created from human interactions, but not by deliberate human design. In particular, one of the principal findings of experimental economics is that, with repeated experience in a variety of market institutions, impersonal exchange in markets converges to the equilibrium states implied by economic theory, even under information conditions far weaker than specified in theory (Smith 2008).

Thus, based on the foregoing, the question arises about conceptualizing institutions as the embodiment of collective rationality (or irrationality), which, in turn, affects individual rationality. With that we arrive at a hypothesis identical with Alan Kirman's assumption, namely that "it is the type of organization rather than the individual behaviour that is central to achieving coordination. Once in place, the organizational structure, itself, coordinates individual activities and makes them consistent" (2010, 6). In other words, in the interrelationship between individual and collective rationality, we have to start not from individual rationality in its neo-classical meaning, but vice versa.

9.6 Institutions and Human Emotions

Institutions are not only the product of constructivist rationality. As a form of human interactions, alongside with other factors, they can either build on certain human emotions or exploit those emotions, which, in turn, provide (or promote) human interactions. In other words, suppose that one of the most important components, which is built into collective rationality, but is excluded by individual rationality in its neoclassical understanding, is the emotional part of human nature.

In contrast to the selfish utility-maximizing model of an individual in mainstream economics, representatives of economic heterodoxy (such as e.g. evolutionary and anthropological economics) point to the altruistic and cooperative features of human nature, which are due both to genetic and cultural human evolution, and which are important for survival of the individual and the social groups (Hodgson 2015, 68–69). They emphasise the role of emotions for our social existence and note that "in a complex culture, emotionally empowered rules can help enhance notions of justice and morality". In particular, Geoffrey Hodgson notes that these features of human nature such as emotional capacities evolved by natural selection are "particularly important for the functioning of law and the state" (Hodgson 2015, 72–73).

Unlike representatives of economic imperialism who expand the principle of individual economic rationality on other, non-market, human relationships and attempt to present the altruistic and cooperative behaviour of human beings in the light of the logic of *homo economicus*,⁵ i.e. treatise altruism as another form of self-interest,⁶ the supporters of the complexity approach argue that both motivations for self-interest and generosity coexist, as obligation coexists with freedom (Cedrine and Novarese 2014).

Indeed, the fundamental socioeconomic and political institutions, such as, for example, institutions of democracy and market, rely both on the constructivist individual rationality and the emotional component of human nature related with non-selfish behaviour. For example, the capability of human beings to trust in others is one of the fundamentals of market transactions. According to different researches, this capability played a significant role in the human evolution, as it helped human beings to coexist together and to use advantages of cooperation and labour division. Thus, although markets are traditionally associated with competition and the search for personal gain, the characteristics of human nature such as adherence to moral principles and capability to trust also play an important role in securing the functioning of markets. In particular, Vernon Smith (2008), referring to the ideas of Adam Smith and his *Theory of Moral Sentiments* (1759), points to the fact of dependency of markets on human virtues and notes that otherwise the costs of monitoring and enforcement would become unbearable.

In their discussion of “animal spirits”, alongside with confidence Robert Shiller and George Akerlof, among others, pay much attention to such human feelings as fairness and faith in stories. In particular, they note with irony that though some textbooks “do mention fairness as a motive, they still demote it to end-of-chapter, back-of-the-book status”, and “it is reserved for those sections that student know they can skip when studying for the exam” (2009, 20). Such little attention to fairness seems paradoxical if we are to take into account, for example, what place Adam Smith devoted to considering “the sense of justice” in his *The Theory of Moral Sentiments* and that, in particular, he concluded:

Beneficence is an ornament that makes the building more beautiful, not the foundation that holds it up; so it's good that it should be recommended, but it doesn't have to be imposed. In contrast with that, justice is the main pillar that holds up the entire building. If it is removed, the whole of human society must in a moment crumble into atoms (Smith 1759).⁷

To sum up, not only a human capacity of rational reasoning but a variety (complexity) of human nature in general, including its emotional part, has the impact on collective rationality since it influences the formation and functioning of socioeconomic institutions, whereas the latter, as it was demonstrated above, should be considered as a specific embodiment (or accumulators) of collective rationality. Thus, it makes sense to think of some key concepts and institutions of a market economy,

⁵ See, for example, Becker (1974).

⁶ The critique of this approach see, for example, in Cedrine and Novarese (2014).

⁷ See Part II, Section 2, Chap. 3.

which are traditionally connected with neoclassical rationality, from the point of view of emotions embedded in these institutions.

9.7 The Institution of Innovative Entrepreneurship

Without taking into account the complexity of human nature, it is impossible, in particular, to explain adequately the phenomenon of innovative entrepreneurship as a driving force of economic development (in the understanding of Josef Schumpeter (2017)). For example, according to William Baumol, “the efforts of entrepreneurs are reallocated by shifts in the sectors of the economy and the lines of activity where profit seems most easily to be earned” (1993, 13). In our opinion, this is an important thesis that explains the intersectoral capital flows, and it is a financial investor who is highly sensible to profits (if to compare him with economic actors in the so-called real sector of economy). So, it is one of the basic motives for the financial capitalist (we use this controversial term here for convenience). As his task is “money making”, he is (at least theoretically) indifferent about what to invest money as long as it is profitable. In other words, he is indifferent whether to invest money in the production of computers or in the production of slippers, or in financial speculations. Here we do not deny the importance of the financial investor in entrepreneurial activity, mindful of Schumpeter’s thesis about the connection between the capital market and the development of the economy. But is Baumol’s thesis true for the Schumpeterian entrepreneur-innovator who drives technological progress?

We dare suppose that the motivation of the great entrepreneur-innovators is much more complex, and the phenomenon of entrepreneurship cannot be explained exclusively by “easiness of the profit earning” and (or) profit maximization principle. For many of these personages we must acknowledge the combinative role of rationality and emotions (as e.g. a propensity to risk in the part not connected with mathematical calculations of probabilistic outcomes). For example, Henry Ford who undoubtedly was one of the greatest entrepreneurs in the industrial age said that “the highest use of capital is not to make more money, but to make money to do more for the betterment of life”, and that “a business that makes nothing but money is a poor business”. Steve Jobs, whose name is associated with the computer revolution, said: “Being the richest man in the cemetery doesn’t matter to me. Going to bed at night saying we’ve done something wonderful, that’s what matters to me”; “Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do”. He also acknowledged: “I have a great respect for incremental improvement, and I’ve done that sort of thing in my life, but I’ve always been attracted to the more revolutionary changes. I don’t know why. Because they’re harder. They’re

much more stressful emotionally. And you usually go through a period where everybody tells you that you've completely failed".⁸

It is noteworthy that Richard Langlois, when considering the question of rationality in relation to the entrepreneur-innovator who is dealing with novel situations (i.e. makes decisions in conditions of uncertainty), quotes Schumpeter's words: "Here the success of everything depends on intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment, and of grasping the essential fact, discarding the unessential, even though one can give no account of the principles by which this is done".⁹

In their *Animal Spirits*, George Akerlof and Robert Shiller also note that "the future of any country is in the hands of the business-people who decide on investments, and it is in large measure dependent on their psychology"; "business – at least successful business – thrives on excitement of *creating* the future" (2009, 143–144).

9.8 The Prisoner's Dilemma, the "Shadow of the Future" and Institutionalization of Emotions

The important question concerns the issue about the neoclassical type of individual rationality in its relation with socioeconomic institutions. If we start moving from micro rationality in the neoclassical sense, we risk concluding with the impossibility of cooperation and the viability of social institutions. One of the best known examples is the prisoner's dilemma, since it illustrates that individually rational behaviour does not necessarily lead to a socially optimal outcome.

The prisoner's dilemma, the originators of which are Merrill Flood, Melvin Dresher and Albert William Tucker,¹⁰ is a standard example of a game analysed in game theory. It shows why two completely rational individuals might not cooperate, even if it appears that it is in their best interests to do so. Imagine that two members of a criminal gang – A (I) and B (II) – are arrested and imprisoned. Each prisoner is in solitary confinement with no means of communicating with the other. Each prisoner is given the opportunity either to betray the other by testifying that the other committed the crime ('defecting strategy'), or to cooperate with the other by remaining silent. The offer is: if A and B each betray the other, each of them serves 2 years in prison; if A betrays B but B remains silent, A will be set free and B will serve 3 years in prison (and vice versa); if A and B both remain silent, both of them will only serve 1 year in prison (on the lesser charge):

⁸<https://www.brainyquote.com/quotes>

⁹Schumpeter (1934/2017); Langlois (1998).

¹⁰See, for example, Tucker (1983).

		II	
		Cooperation	Defection
I	Cooperation	(1, 1)	(3, 0)
	Defection	(0, 3)	(2, 2)

This hypothetical scenario demonstrates that a choice to betray is a dominant strategy because defection always results in a better payoff than cooperation regardless of the other player's choice. Mutual defection is the only strong Nash equilibrium in the game (i.e. the only outcome from which each player could only do worse by unilaterally changing strategy). The dilemma, then, is that mutual cooperation yields a better outcome than mutual defection but is not the rational outcome because the choice to cooperate, from a self-interested perspective, is irrational.

In fact, the prisoner's dilemma deals with the perfectly atomistic approach to rationality as it ignores institutional environment and regards two prisoners who are members of the same criminal gang in a way that the fact of existence of this criminal gang does not influence the choice of the prisoners, and they do not have a fear of punishment from other members of this gang. Such rationality resembles rather the reflexive reaction of an animal on a piece of food in front of its muzzle, but not a work of human mind and reasoning. Is it not the case that the almighty mind of individual rationality, implying unlimited knowledge and possession of information, turns out to be only a primitive reflex of the animality greedy to the pleasures?

Moreover, in a such a type of interaction (a game), the assumption that each player is self-interested and always chooses the largest of two immediate payoffs for himself, strangely resembles the principle of entropy increase: if we consider the evolution of an isolated system, this unstable system left on its own will be destroyed, gradually converting into more probable and stable states; at the same time both probability and entropy are growing (Brillouin 1964). Since entropy is associated with a disorder in a system, the above-mentioned analogy inspires us to doubt the rationality as it is presented by neoclassical economics, and to think about rationality in a wider context, namely in the terms of the process of ordering and system complexity.

Also, the prisoner's dilemma does not presume emotional affection and trust (which can counteract the defective strategy) between persons because it does not take into account their past interaction, and also assumes that two individuals are destined never to meet again. In this situation, "no matter what the other does, the selfish choice of defection yields a higher payoff than cooperation" (Axelrod and Hamilton 1981, 1391). In their seminal article *The Evolution of Cooperation*, Robert Axelrod and William Hamilton (1981) note that, in many biological settings, the same two individuals may meet more than once. According to their model, probability of cooperation (correspondingly, probability of a defection strategy, but in opposite direction) depends on "the history of interaction so far" and the probability of the event, that after current interaction the same two individuals (players) will meet

again. The latter is also expressed as “the shadow of the future” that must be long; no player should know when the game will end (Axelrod 1984).

For evolution of cooperation it is very important that “an individual must not be able to get away with defecting without the other individual being able to retaliate effectively”; for this it is necessary that “the defecting individual must not be lost in an anonymous sea of others”. Axelrod and Hamilton (1981) note that higher organisms avoid this problem by their well-developed ability to recognize many different individuals of other species (they have a more complex memory, more complex processing of information; in humans, a better ability to distinguish between different individuals is largely based on the recognition of faces).

Based on game theory and the ideas of Robert Axelrod, it could be interesting to conceive of some institutions from the point of view of their role in the formation and support of “the shadow of the future” and, thus, promoting cooperative (non-defective) behaviour. For example, it can be the institution of church, i.e. the institutionalization of those human emotions and feelings, which are connected with the fear of death, faith in God (gods), faith in the afterlife, fear of punishment for sins (e.g. faith in karma). In other words, the church-supported faith in the afterlife and punishments from God, prolonging the “the shadow of the future”, could facilitate the evolution of social cooperation; and this is one of the most obvious examples of how emotions are built into institutions, forming collective rationality (or irrationality).

9.9 Concluding Remarks

Rationality relates to information (knowledge), its accumulation and use. Thus, rationality is a characteristic of the complex, primary living systems. A feature of complex (living) systems is an accumulation of (free) energy and information, so the fundamental characteristic of rationality is to prevent the process of disordering and to the growth of entropy in a system. In this sense, rationality is an action (phenomenon or feature) that is intended to counteract the entropy processes and the growth of chaos in the system, and, thus, has similar functions to institutions, as the goal of both should be organization in a relevant system. In turn, neoclassical rationality in its connection with the idea of optimality and efficiency must be regarded as a particular case of this general anti-entropic foundation of rationality.

In the process of production of collective information, not only the human capacity to reason but also other human abilities such as risk appetite and the search for the new are involved, since they increment collective experience. Not only self-interested calculations of the future outcomes, but also human emotions such as feelings of affection, confidence, and fairness play an important role in collective coexistence and thus, influence social interactions which adopt the form of different institutions, and influence the formation and character of collective rationality. Collective rationality is embodied in social institutions and cannot be reduced to individual rationality in its narrow neoclassical meaning.

According to modern social psychology and neuropsychology, decisions based on emotions differ from decisions based on reason, but they help to support macro-rationality as they allow us to consider the interests of others in our decisions. So-called economic imperialism which extends the principle of individual economic rationality to other human relationships, not connected directly with economic activity, ignores the complexity of human nature, the role of human emotions and altruism, and overvalues the calculating capacities of the human brain. The emergence and functioning of many important socioeconomic institutions cannot be explained by narrowly selfish understanding of individual rationality.

A person is able to act both selfishly and altruistically and the way in which he/she will eventually act depends on the environment. A society which has much more information than an individual provides specific values that then become criteria for the future decisions of individuals. Political processes, like democracy sustained by free media, help the society to distinguish crucial values and to find and define the problems that the given society wants to solve. In its turn, the realized and expressed 'will' of a society takes a form of relevant institutions which then not only provide the criteria of 'be rational' and efficient but also have instruments to prevent or enforce that society to act according to these criteria.

In this sense, if the existing institutions favour altruism and not only egoism, there will be much more space and opportunities for individuals to develop their altruistic traits, especially if altruistic behaviour is considered by a society as rational. The neoliberal ideology, through its formal and non-formal institutions, expands the conviction that altruistic behaviour is not rational. At the same time, behavioural studies and social psychology open the new view, namely that altruism can pay off and in the end be a rational strategy. Societies with developed democracies seemed to have learned that diversity allows them to act more rationally as the whole and instil the values of the whole in individuals through relevant institutions. Diversity allows the society to minimize risks in an insecure environment and combat the challenges with which we have to deal.

Human greed and human generosity, egoism and altruism, reason and emotionality are embedded in different activities that can equally be important for the existence of human society as a whole. However, the prevalence of the sole characteristic, pushing out all the others, leads, in Ortega y Gasset's words, to pernicious homogeneity. So, starting from a narrow self-interest individualism, positivism and short-termism, we risk getting the "one-dimensional man" (the term used by Herbert Marcuse) who similarly to José Ortega y Gasset's "mass man" (Ortega y Gasset 1930), is capable of destroying the human civilization, including the intelligence that is the basis of human rationality.

References

- Akerlof, G.A., and R.J. Shiller. 2009. *Animal spirits*. Princeton/Oxford: Princeton University Press.
- Axelrod, R. 1984. *The evolution of cooperation*. New York: Basic Books.
- Axelrod, R., and W. Hamilton. 1981. The evolution of cooperation. *Science* 211 (4489): 1390–1396.
- Baumol, W. 1993. *Entrepreneurship, management, and the structure of payoffs*. Cambridge, MA: MIT Press.
- Becker, G.S. 1974. A theory of social interactions. *The Journal of Political Economy* 82 (6): 1063–1093.
- Brillouin, L. 1964. *Scientific uncertainty and information*. New York: Academic.
- Cedrini, M., and M. Novarese. 2014. Economia, Altruismo e Dono. In *Il dono. Valore di legame e valori umani. Un dialogo interdisciplinare*, ed. G. Faldetta and S. Labate, 169–189. Palermo: Di Girolamo.
- Gigerenzer, G. 2008. Why heuristics work. *Perspectives on Psychological Science* 3 (1): 20–29.
- Hayek, F. 1945. The use of knowledge in society. *The American Economic Review* 35 (4): 519–530.
- Henrich, J. 2015. *The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter*. Princeton: Princeton University Press.
- Hodgson, G.M. 1988. *Economics and institutions: A manifesto for a modern institutional economics*. Cambridge: Polity Press.
- . 2015. *Conceptualizing capitalism: Institutions, evolution, future*. Chicago: University of Chicago Press.
- Hogan, B., and L. Marcelle. 2017. The complementarity of means and ends: Putnam, pragmatism, and the problem of economic rationality. *Graduate Faculty Philosophy Journal* 38 (2): 401–428.
- Kahneman, D. 2011/2012. *Thinking, fast and slow*. London: Penguin Books.
- Kirman, A. 2010. *Complex economics: Individual and collective rationality*. London/New York: Routledge.
- Langlois, R.N. 1998. Rule-following, expertise, and rationality: A new behavioral economics? In *Rationality in economics: Alternative perspective*, ed. K. Dennis, 55–78. New York: Kluwer Academic Publishers.
- North, D.C. 1991. *Institutions, institutional change and economic performance*. St Louis: Washington University.
- Ortega y Gasset, J. 1930/1993. *The revolt of the masses*. New York/London: W.W. Norton & Company.
- Schumpeter, J. 1934/2017. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. New York: Routledge.
- Sen, A. 2002. *Rationality and freedom*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Simon, H.A. 1955. A behavioral model of rational choice. *The Quarterly Journal of Economics* 69 (1): 99–118.
- . 1997. *Administrative behavior: A study of decision-making processes in administrative organisations*. 4th ed. New York: Free Press.
- Smith, A. 1759. *The theory of moral sentiments and on the origins of languages*, ed. D. Stewart. <https://oll.libertyfund.org/titles/smith-the-theory-of-moral-sentiments-and-on-the-origins-of-languages-stewart-ed>
- Smith, V. 2008. *Rationality in economics: Constructivist and ecological forms*. New York: Cambridge University Press.

- Sunder, S. 2002. Market as artifact: Aggregate efficiency from zero intelligence traders. In *Models of a man: Essays in memory of Herbert A. Simon*. Cambridge, MA: MIT Press.
- Tucker, A.W. 1983. The mathematics of Tucker: A sampler. A two-person dilemma: The Prisoner's dilemma. *The Two-Year College Mathematics Journal* 14 (3): 228–232.
- Walsh, V. 2007. Amartya Sen on rationality and freedom. *Science & Society* 71 (1): 59–83.
- Williams, N. 2009. Collective rationality. *Current Biology* 19 (15). <https://doi.org/10.1016/j.cub.2009.07.045>.

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