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The Development of Rationality in Economics

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Abstract

The concept of rationality first originated from philosophy and later evolved into rationality in economics, and then rationality has been the basic assumption of mainstream economics. With the development of economics and the integration of multiple disciplines, the concept of rationality in economics has been expanded and evolved, and different economic schools have put forward their own concepts of rationality. Classical and neoclassical economics advocate the complete rationality based on the hypothesis of "economic man"; later, behavioral economics and other schools have questioned the complete rationality, and they have proposed bounded rationality or irrationality; in fact, some other scholars have also proposed some other concepts of rationality, such as “evolutionary rationality”, “reasoned scrutiny rationality”, “cognitive rationality” and so on, which have made the concept of rationality in economics develop continuously. This paper briefly reviews the sources of the concept of rationality, the concept of rationality in traditional economics, the theory of bounded rationality and the other theories of rationality, in order to clarify the abstract concept of rationality.

Keywords: economic man, perfect rationality, bounded rationality, cognitive ability

1. The Origin of Rational Ideas

The concept of "reason" originated from the ancient Greek philosophical terms, "logos" and "nous". The word "logos" has the meanings of argument, explanation and reason. The word "nous" has the meaning of spirit, reason, mind and so on. "Logos" and "nous" became widely used terms in philosophy, eventually falling under the rubric of rationality/reason. Heraclitus in ancient Greece pointed out that "the only thing that remains unchanged is the law behind them in all movements and changes, which is the reason in all things", in which "reason" is logos (Tilly, 1995). Plato believed that the soul covered reason and other spiritual activities, and the soul included three levels, with reason at the highest level (Yin Ding, 1989). Actually, the reason of the ancient Greeks is mainly the reason in the ontological sense, that is, the natural reason, which is essentially the cosmic reason, emphasizing that human reason and the world reason are the same thing. To sum up, "rationality" in philosophy refers to a kind of thinking activity or ability to form concepts, judgments and reasoning. As opposed to sensibility, it represents the advanced cognitive form and cognitive ability of human beings. It also refers to the ability to intellectually control one's own behavior (the ability to self-discipline and self-control).

2. The Concept of Complete Rationality

The "rationality" of classical economics is actually a kind of "complete rationality". Classical economics takes "complete rationality" and "optimization principle" as its basic assumptions, and holds that the means chosen by individuals to achieve their goals are rational, the information grasped by the individual is complete and the individual's cognitive ability is complete.

2.1 The Concept of Rationality in Classical Economics

The classical economists represented by Adam Smith believe that the actor is a "rational economic man" with complete rationality. "Rational economic man" mainly includes the following three meanings: First, self-interest-starting from the concept of "self" and pursuing self-interest is the original driving force of economic man's behavior. Second, rationality-decision makers make judgments based on information to maximize benefits. Third, the "invisible hand"-within the framework of the code of conduct of human society, the behavior of economic man in pursuit of the greatest interests will increase the total wealth and welfare of society. "Rational economic man" is completely rational, and has complete information and unlimited resources when making decisions (Smith, 1972; 1974). The concept of "rational economic man" establishes the inherent and consistent logical relationship between self-interest motivation and human rational behavior driven by human self-concept. Smith not only defined the authority of the state or government, but also proved that as long as the corresponding production relations (such as laws, systems, etc.) can satisfy and stimulate the self-interest of individuals, resources can be effectively allocated through the spontaneous regulation of the market, so as to make the country strong and the people rich.

2.2 Rational Concept in Neoclassical Economics

Neo-classical economics adheres to the hypothesis of "rational economic man" mentioned above, and gradually forms a complete theoretical system through the development of Walras and Marshall. At the same time, it also uses mathematics and other disciplines to establish models to enrich and develop classical economics, which mainly studies the rational concepts and behaviors of organizations and individuals in economic activities. Neoclassical economics has some theory features: Firstly, the concept of economic man is extended. Secondly, the behavioral motivation of economic man is regarded as the motivation of various factors of production (personification) to pursue their own interests. Thirdly, mathematical tools are introduced. Finally, the "Pareto optimal conditions" on how to realize both the unity of individual interests and social interests are put forward. So, Neo-classical economics has successfully expanded partial equilibrium analysis to general equilibrium analysis.

Harstad & Selten (2013) proposed that neoclassical means that broad models and inferences are based on the premise that all economic decisions lead to optimization of profit or utility (rationality). Utility theory is a widely used model of rational analysis. Utility is a yardstick of people's satisfaction from purchasing goods or obtaining services. The goal of utility theory is to maximize utility. Machlup (1946) stated that the driver unconsciously performs a rather complicated calculation when overtaking another vehicle on the road in his defense of that theory of optimization in the classical economy.

3. The Concept of Bounded Rationality

Generally speaking, "complete rationality" is the most basic assumption of mainstream economics. However, as more and more people pay attention to the phenomenon of "irrationality", scholars begin to reflect on "complete rationality", and many scholars begin to question neoclassical economics. Pigou & Robertson (1924) called the concepts of marginal cost and marginal productivity in neoclassical economics "empty boxes", and claimed that they don't have any counterparts in real companies. A similar argument about full-cost pricing was made by Hall & Hitch (1939). Lichtenstein & Slovic (1971) used the method of experimental economics to demonstrate the defects of classical economics, and first discovered the phenomenon of preference reversal. The bubble in the financial and real estate markets has also caused query and criticism of neoclassical economics in the academic world. Shiller (2000) proposed that neoclassical theory cannot be reconciled with the speculative bubbles observed in several major Western economies in previous decades, and there is irrational exuberance in the market. In a word, the theory of bounded rationality holds that the value orientation of the actor usually presents a diversified performance, which is not only restricted by various objective factors, but also in change. In addition, People's ability, resources, information, knowledge and experience are limited, so, people will stop at the satisfactory solution rather than stick to the optimal solution in most cases.

3.1 The Rise of the Concept of Bounded Rationality

Combining with the exploration and practice of psychological cognition, Herbert Simon and others systematically pointed out the inconsistency between complete rationality in classical economics and reality, which is embodied in the following aspects:

3.1.1 Plurality of Goals of the Actor

Simon (1982) cited the example of developing a computer procurement strategy for a company to illustrate that the goals of the economic activities are often diversified, not single. At the same time, the goal of economic activities is not absolute, but can be adjusted with the change of the interests of the actors. In addition, from the perspective of the hierarchy of goals, there is a shift between goals and means. From the three characteristics of the goal, it is difficult to find the absolute best goal in the actual economic activities. Therefore, the possibility of the existence of the absolute optimal solution in the real world is extremely low. In fact, the preferences of actors are constantly changing in reality, and preferences affect people's decision-making, producing different results. For example, many people will change from risk-seeking to risk-averse when making investment decisions with age.

3.1.2 The Limitation of the Actor's Ability

Cognitive ability refers to the ability of human brain to process, store and extract information, which belongs to the "intrinsic" ability of human beings and is also a part of human capital (Meng Yijia, 2014; Xie Yu et al., 2014). In terms of cognitive ability, real individuals have limited perception ability, limited memory ability and limited information processing ability for external information. Therefore, there is only limited access to the truth. In terms of cognitive ability, the individual has many defects: First, the perception ability is limited. Human senses come from external stimuli, and it is precisely because of the threshold of human senses that the ability of real individuals perceiving the environment is often limited. Second, memory capacity is limited. Human memory is essentially a process of processing external information, and external information that is usually stored in the short-term memory stage, and the capacity of short-term memory is often only 5 to 9 information blocks, while too much information will reduce the efficiency of memory. Third, information processing capacity is limited (Simon, 1986). In the real world, most economic decision-making problems are often complex. People need to consider not only quantifiable economic benefits, but also non-quantifiable factors such as social and ecological benefits, so people often can not make accurate decisions and predictions.

3.1.3 The Finiteness of the Actor's Resources

In the face of specific goals, human energy and other resources in their hands are so limited, which leads to the fact that people often cannot achieve the optimal goal and can only find satisfactory results under the condition of limited resources. For example, it is difficult for people to obtain complete information when making decisions, and they are often affected by information asymmetry. Economic activities require timeliness, for example, "Time is money" requires people to cherish time, seize opportunities and complete economic activities with the corresponding time limit. But in the short term, many resources are limited, and human behavior is subject to many constraints.

3.2 The Connotation of Bounded Rationality

Simon (1982; 2004) quoted the knowledge of experimental psychology and cognitive science to verify that human rationality can only be based on limited cognition and limited resources when he improved the traditional concept of rationality. Simon put forward the concept of bounded rationality. He replaced the assumption of "rational man" with the assumption of "manager", and "utility maximization" with "satisfaction".

In *Management Behavior,* Simon (2004) emphasized two key words of the concept of bounded rationality: "Search" and "Satisfaction". People often don't have alternatives at first, so they have to spend time and energy searching. In addition, in real life, because the time and energy of real individuals are limited, they often do not exhaust all resources to find all alternatives before making decisions. Instead, it pays a certain price (acceptable price) to find part of the solution and choose it, as long as the choice can reach the desired level or satisfactory level. Simon (1982; 2004) once used "ants" as a metaphor for human beings, believing that human beings only have limited rationality in the real environment and could only search satisfactorily. An ant doesn't crawl in a straight line, but in a tortuous way. This does not mean that ants have complex and advanced cognitive abilities, but only the complexity of the external world, such as branches and gravel blocking their straight path. Ants can remember the general direction of the nest, but due to the limitation of vision, they cannot predict the specific route. They can only take one step at a time and make temporary choices according to the current situation. According to Simon, people and ants have something in common from a cognitive level. Because of the limited cognitive ability of the outside world, people cannot systematically and accurately judge much information and its consequences. The behavior of real individuals can only reflect the complexity of the environment in which they live, and the assumption of complete rationality in classical economics rarely appears in real life.

Therefore, Simon (2004) argued that decision-makers in reality are somewhere between complete rationality and irrationality, and they are "managers" with only "bounded rationality". The goals and value orientations of "managers" are constantly changing and even completely changing with the passage of time. In the real world, "managers" only have limited mental, knowledge, experience and other resources, and they are not extravagant and impossible to achieve the absolute optimal solution, but only satisfied with the expected solution. Obviously, under the condition of meeting people's expectation level, satisfactory selection can greatly reduce the search cost and calculation cost, and simplify the decision-making process. Therefore, real individuals tend to make decisions and actions according to the standard of satisfaction. The "manager" model is of great significance to information processing. The "information crisis" that people are facing is no longer a problem of being unable to make decisions because of the lack of information, but a problem of frequent mistakes in decision-making caused by the overflow of information. People can only realize that their rationality is limited. Only in this way can people make full and reasonable use of limited resources to achieve their goals and solve one practical problem after another, instead of spending a lot of resources to pursue the optimal solution.

3.3 The Expansion of the Concept of Bounded Rationality

Firstly, this paper introduces the hierarchy of needs theory. In addition to the basic needs of physiology and safety, human needs also include higher needs such as social interaction, respect and self-realization. The theory of hierarchy of needs has a great impact on the traditional hypothesis of economic man, because the traditional hypothesis of economic man holds that people are self-interested and that the pursuit of maximizing economic interests is the only need of human beings. The theory of hierarchy of needs makes the hypothesis of human nature closer to reality, thus improving the ability to explain reality. Secondly, this paper introduces modern behavioral economics. On the basis of Simon's "bounded rationality", Kahneman and others combined the latest achievements of experimental psychology and cognitive psychology to create modern behavioral economics, and finally established the historical status of "bounded rationality". There is a big difference between the belief and choice of people in reality and the optimal belief and choice of rational people in classical economics.

4. Modern Rational Concept

Bounded rationality is the development of complete rationality, but it also has many limitations. Rationality and bounded rationality in neoclassical economics refer to the psychological motivation of individual profit-seeking, which can not explain the moral and ethical basis of human behavior choices (Deng Hongtu, Song Gaoyan, 2017). Therefore, with the continuous development of economics, more and more scholars began to reflect on complete rationality and limited rationality, and put forward such rational concepts as evolutionary rationality, reasonable and prudent rationality, and cognitive rationality, which made the concept of rationality expand and extend continuously.

4.1 Hayek's Evolutionary Rationality

In The Fatal Conceit and The Road to Serfdom, Hayek (2000; 2015) involved collectivism, socialism, freedom and other ideas in addition to his own view of rationality. He opposed constructive rationality (rationalism), thus putting forward evolutionary rationality as opposed to constructive rationality. According to Hayek, In fact, society is an "organism" which contains infinite elements and the relationship between elements is extremely complex, but human reason is limited, and people can not fully grasp everything of this extremely complex "organism". He believed that rationality comes from the long-term process of social evolution, and rationality evolves slowly, which is embedded in various customs, laws and other cultural systems. At the same time, according to Hayek, human rational ability is limited, which makes people ignorant or uncontrollable about most of the existing things. The limitation of human reason mainly comes from the following reasons: reason can not dominate human wisdom (there is a super-conscious mind); rationality cannot accurately predict the organism of human society.

4.2 Amartya Sen's Reasonable and Prudent Rationality

Amartya Sen (2006), a Nobel Prize winner, put forward his view of rationality in *Reason and Freedom*, which is reasonable and prudent. Amartya Sen summed up the concept of modern economic rationality. He believed that there are three kinds of rationality: "internal consistency of choice", "self-interest maximization" and "general maximization". First, He made a judgment on these three mainstream views of rationality, among which self-interest maximization is to impose external specific goals or principles on rational choice, and dual display preference is to impose internal consistency conditions on rational choice, but these will make rationality lose some important dimensions, and the combination of "internal consistency" and "benefit maximization" is not inevitable. Then, Amartya Sen proposed a more complete view of rationality, that is, reasonable and prudent rationality: on the basis of the original economic rationality, he added a very important condition-reasoned scrutiny. Amartya Sen advocated that people do pursue their own goals, and the key is that people examine the goals they pursue, such as the rationality of the goals.

4.3 The Cognitive Rationality of Raymond Boudon

Raymond Boudon (1998), a sociologist, was the first to put forward "cognitive rationality", which explained rationality from the perspective of sociology and reconciled the conflict between "instrumental rationality" and "value rationality" to a certain extent. He presented a concrete description of "cognitive rationality": individual X takes action Z because he has sufficient reason to take or believe action Z. In fact, there is no essential difference between Raymond Boudon's "cognitive rationality" and the "rationality" in "instrumental rationality" and "value rationality", and his "cognitive rationality" is only a simple combination of the two. In addition, Huang Kainan, Cheng Zhenyu and other scholars (2008) also put forward their own concept of "cognitive rationality", which is quite different from Raymond Budong's "cognitive rationality". Firstly, from the perspectives of behavioral economics, cultural evolution theory and brain neuroscience, Huang Kainan explored the systematic influence of three cognitive dimensions, namely "individual psychology", "social and cultural evolution" and "biological evolution", on individual economic behavior (rationality). Then, based on the above analysis, Huang Kainan et al.explored the origin and connotation of individual rationality from the perspective of cognitive science. They found that because of the limitation of internal cognitive ability and the variability of external environment, individual rationality is between complete construction and complete evolution.

5. Summary

This paper reviews the source of rational concept, the concept of complete rationality, the concept of limited rationality and some new rational concepts. We find that rationality originated from philosophy and later evolved into the rationality of economics. With the development of economics and the integration of multi-disciplines, the concept of rationality in economics has been extended. Different schools of thought put forward their own ideas of reason. Classical and neoclassical economics advocated the complete rationality of "economic man"; Later, many schools such as behavioral economics questioned complete rationality and advocated bounded rationality or even irrationality. In fact, some scholars have also put forward some other rational concepts, such as evolutionary rationality, reasonable and prudent rationality, cognitive rationality and so on. All these make the rational concept of economics develop and improve continuously. Generally speaking, the concept of rationality has several important characteristics: firstly, rationality is a very basic and abstract concept; Secondly, rationality is a concept involving many disciplines, which has its own meaning in philosophy, sociology, economics and other disciplines. Finally, rationality in economics is a fundamental assumption and an evolving concept.

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