Huang Haochen, Lu Liping,

THE EVOLUTION OF NATURAL MONOPOLY THEORY

***Huang Haochen, Lu Liping**, master students at the faculty of law*

Belarusian State University, 4 Niezaliežnasci Avenue, Minsk 220030, Belarus

Monopoly is a traditional concept in economics, meaning when one firm provides a certain good or service to the entire market at a lower cost than two or more firms. Natural monopoly is a kind of monopoly. Its traditional industries include natural gas supply, electricity supply, water supply, etc. When the production scope of a company's monopoly involves the above-mentioned natural economy, it is a natural monopoly.

In the history of the development of economic thought, there were not many mentions of the concept of «monopoly» in the early days, although at that time, monopoly behavior already existed objectively in economic life. For example, the monopoly of salt, iron and wine in China's feudal era. But in the whole economic life at that time, people didn't pay much attention, and this way was usually dominated by the government. With the advancement of technology and the development of social economy, monopoly has become an increasingly common market structure. Most of the monopoly theories in the future have inherited these ideas and developed from them.

In classical economics, natural monopoly is first manifested in land lease. John Stuart Mill talked about the issue of natural monopoly in 1848. By observing the operation of public facilities in London, he put forward such a point of view: if a certain kind of public facilities such as power supply is operated by one enterprise, then according to the then Pricing with a higher profit margin will reduce the price competition in the competition of multiple companies and greatly reduce the price [1]. From the 19th to the 20th century, with the wave of industrialization, the economy has developed rapidly. Modern economists such as Samuelson and Nordhaus are aware of the economic factors of natural monopoly, so they take economies of scale as their theoretical basis and analyze the relationship between natural monopoly and economies of scale. They argue that a natural monopoly arises when economies of scale are so powerful that only one firm can survive [2]. This theory was widely recognized at that time.

Different from the early natural monopoly theory, modern economics began to study natural monopoly from the perspective of economic characteristics. It is no longer satisfied with the viewpoint of natural conditions, but more on the scale economy as the basis to explain the natural monopoly theory. In 1927 Marshall's "Principles of Economics" said: "Those industries with rising average costs often have competitive industries, while those industries with falling average costs generally produce monopoly. In this type of industry, the ideal market structure is monopoly." [3]. Likewise, since the best structure is a monopoly, the best way to regulate monopoly is through government regulation.

By the middle of the twentieth century, with the introduction of the concept of subadditivity of costs, the idea that economies of scale lead to natural monopolies was challenged. James Bumbright, after studying the relationship between economies of scope and natural monopoly, proposed that in some public utility fields, even if the unit cost rises, it is still more economical for one enterprise to be compared to many enterprises. American economists Baumol, Sharkey and Willig put forward the concept of cost subadditivity through systematic and in-depth research. According to their theory, the industries considered to be natural monopolies cover a very wide range [4].

From the evolution of economic thought on the theoretical research on natural monopoly above, we can see the following points of consensus: natural monopoly industries mainly exist in industries with significant economies of scale. The concept of cost subadditivity makes people realize that even if there is no economy of scale, as long as one company can produce at a lower cost than two or more companies and can provide products or services more effectively, it is still natural monopoly; for industries that are determined to be natural monopolies, it is not suitable to introduce competition, but should be regulated by the government, and a company monopolizes; simply use a quantitative method, including economies of scale and cost sub-additivity, to judge whether it is natural monopoly is difficult, and many factors such as technology and demand must be considered.

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