



# The Special Technical Requirements of Promoting the Mixed Reform of Natural Monopoly Enterprises

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**Abstract.** In China, due to the large differences in the development of different natural monopoly industries, and the unique characteristics of these industries such as large asset scale and strong public welfare attributes, special requirements are put forward for the promotion of mixed reform in this field. The special technical requirements of natural monopoly enterprises to promote mixed reform are characterized by physical network attributes, social public welfare attributes, large differences in basic conditions of mixed reform, high entry threshold, and business diversification.

**Keywords:** Natural monopoly industry · network attribute · public welfare attribute · entry barrier

## 1 Introduction

The natural monopoly industry has always been a difficult point of reform due to its wide range and complex technology. At present, China's railways, telecommunications, electric power, oil and gas and other industries and fields with natural monopoly attributes are trying to open up partially. Among them, railways mainly include inter-city railways, municipal (regional) railways, resource-developed railways and feeder railways; Telecom focuses on some basic telecom services such as broadband, mobile resale and virtual number segment, as well as network facilities such as user resident network; The oil and gas industry is open to private investment in gas transmission pipeline network; The power grid link is mainly the participation of some private capital in local distribution companies [1].

## 2 Physical Network Attributes

Natural monopoly enterprises, such as power grids, telecommunications and railways, must rely on specific physical networks to provide products and services to end consumers. Physical network properties make it network economy, scale economy and scope economy [2]. The physical network attributes of natural monopoly enterprises determine that maintaining the uniform physical form and the uniform economic management can produce the greatest economic effect, which requires that the unity of network physics and operation must be considered in the reform of natural monopoly enterprises.

### 3 Social Public Good Attribute

The obvious difference between natural monopoly industry and other industries lies in its social public welfare attributes, which are mainly reflected in the following three points: First, universal service. The products or services of most natural monopoly industries are the basic needs of the public, and the regulatory bodies need to ensure that the services provided are stable and the quality is reliable. Universal services are the basic requirements for natural monopolies to provide basic products or services at a price that the vast majority of people can afford. These are also the most basic requirements for natural monopolies. Second, the natural monopoly industry is the foundation of public ownership economy [3]. Natural monopoly industry is the lifeblood industry of national economy and the foundation of national economic and social security and stability. Important transmission networks, such as oil and gas network and power grid, are the major infrastructure of national resources and energy, and the important foundation to ensure the safe transmission and stable supply of important resources and energy [4]. Third, it undertakes important political and social responsibilities. While pursuing general commercial profits, natural monopoly industries also bear important political and social responsibilities, including implementing major national strategies, promoting national economic transformation, environmental protection and disaster relief. For example, in the implementation of the “One Belt, One Road” strategy, the natural monopoly industry takes the lead in responding and playing a leading role; State Grid Company in the Olympic Games, G20, two sessions and other important periods of electricity protection, are an important reflection of natural monopoly enterprises to fulfill political and social responsibilities [5].

Therefore, the maintenance of the nature of public welfare must be considered in the process of the mixed reform of natural monopoly enterprises. Of course, the public welfare attributes of different businesses of natural monopoly enterprises are different. The public welfare attributes of competitive businesses are obviously weaker than that of monopolistic businesses, so they should be treated differently in the process of mixed reform.

### 4 Different Degree of Marketization

Compared with enterprises in other non-natural monopoly industries, natural monopoly enterprises have many entry barriers and high entry barriers, which are mainly reflected in the following aspects. First, the scale of assets is large. Due to the economies of scale, scope and cost subadditivity of natural monopoly industries, the scale of natural monopoly enterprises is far larger than that of other types of enterprises. The second is the high technical content. Natural monopoly enterprises are distributed in electric power, railway, civil aviation, telecommunications and other industries, which represent the technical level of the national economy and have high technical content. Third, there are strict system entry barriers. China has specified strict requirements for the access of natural monopoly industries in terms of system, and implemented strict approval system for the access of natural monopoly industries. The doors of monopoly industries are not fully open to private enterprises.

The differences in the degree of marketization directly lead to significant differences in the external competitive environment and internal governance structure faced by different enterprises, so they should also be treated differently in the selection of fields, cooperation objects and methods of mixed reform.

## 5 High Entry Threshold

Compared with enterprises in other non-natural monopoly industries, natural monopoly enterprises have many entry barriers and high entry thresholds, which are mainly reflected in the following aspects. First, the scale of assets is large. Due to the economies of scale, scope and cost sub-additivity of natural monopoly industries, the scale of natural monopoly enterprises far exceeds that of other types of enterprises. However, due to the large land area, the support of policies to state-owned enterprises especially heavy industry, the scale of natural monopoly enterprises in railways, power, aviation and so on is huge. Because of the late start, industry restriction and other factors, the private capital of our country is far smaller than the natural monopoly enterprises. In 2019, the asset scale of China Railway Group exceeded 8 trillion yuan, nearly 10 times that of Huawei, the largest private enterprise in China. In addition, in 2019, the total asset scale of the 7 typical monopoly central enterprises in the figure was 22.7 trillion yuan, close to the cumulative operating income of the top 500 domestic private enterprises (28.5 trillion yuan). Second, high technology content. Natural monopolies are distributed in the electric power, railway, civil aviation, telecommunications and other industries, which represent the technical level of the national economy, high technology content. According to the survey of All-China Federation of Industry and Commerce, Chinese private enterprises mainly rely on traditional manufacturing industries such as textile, clothing, shoes and hats, machinery and equipment, electronics and traditional service industries such as commerce, real estate and construction. The technology content of these industries is low, which makes technology become one of the main barriers for private enterprises to enter natural monopoly industries. Third, there are strict system entry barriers. On the system, strict requirements are specified for access to natural monopoly industries, and strict approval system is implemented for the entrance of natural monopoly industries. The door of monopoly industry is not fully open to private enterprise.

The high entry threshold of natural monopoly industry makes the capital entering this field must meet certain requirements of technology, capital and policy permit, which must be taken into account in the process of mixed reform.

## 6 Business Diversification

In real life, natural monopoly enterprises not only produce or provide single goods and services, but also tend to implement diversified operations due to their advantages in capital, technology, brand and other aspects. The business of China's natural monopoly enterprises can be divided into three categories. First, monopoly business. Monopoly business is the foundation and main business of natural monopoly industry, such as power grid of power grid enterprises, railway management and operation of railway

supply companies, oil and gas pipelines in petrochemical industry, etc. Many characteristics of natural monopoly enterprises are also caused by monopoly business. The second is competitive business. Competitive businesses are often businesses at both ends of the pipeline network, such as production of products, distribution and sales of products and services. Compared with monopoly business, competitive business has lower entry threshold and higher degree of marketization. Third, new business. With technological progress, social supply and demand and other factors, many new businesses have emerged in the natural monopoly industry. With its advantages, natural monopoly enterprises have expanded rapidly in new business areas, such as electric vehicle charging and replacement of power grid enterprises. As a newly emerging field, new businesses often have many market entities at the beginning.

There are significant differences between monopolistic business, competitive business and new business of natural monopoly enterprises in terms of entry threshold, marketization degree and the strength of their public welfare attributes. Therefore, a one-size-fits-all policy must not be adopted in the process of mixed reform, and they should be treated differently.

## 7 Conclusion

Compared with other industries, the special technical requirements of natural monopoly enterprises to promote mixed reform are characterized by physical network attributes, social public welfare attributes, large differences in basic conditions of mixed reform, high entry threshold, and business diversification. Specifically, natural monopoly enterprises, such as power grids, telecommunications and railways, must rely on specific physical networks to provide products and services to end consumers. The natural monopoly industry has the social public welfare attribute. One obvious difference between the natural monopoly industry and other industries is its social public welfare attribute, which is mainly reflected in the universal service. The natural monopoly industry is the foundation of the public ownership economy and bears important political and social responsibilities. Different natural monopoly industries have different degrees of marketization, and the basic conditions of mixed reform vary greatly, mainly reflected in the obvious differences in market structure, listing status and equity diversification. The entry threshold is high. Compared with enterprises in other non-natural monopoly industries, natural monopoly enterprises have many entry barriers. The entry threshold is high, which is mainly reflected in the existence of strict system entry barriers with large asset size and high technology content. Business diversification, natural monopoly enterprises often implement diversification in real life, and business can be divided into three types: monopoly business, competitive business and new business.

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