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The Mechanism and Measures of Adjustment of Industrial Organization Structure: the Perspective of Energy Saving and Emission Reduction

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Abstract

Based on the theory of scale economies, this paper probes the mechanism and measures of adjusting industrial organization structure to promote energy saving and emission reduction. The structural factors and efficiency factors influencing energy consumption per unit of GDP interact with each other. Among which, the interaction between economies of scale and industrial organization structure constitutes the implementation mechanism that industrial organization structure is adjusted to promote energy saving and emission reduction. The empirical study of energy efficiency of some enterprises in the steel industry in China demonstrates the close relationship between energy efficiency and the scale of enterprises. In the end, measures of adjusting the industrial organization structure are put forward to promote energy saving and emission reduction.

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Key Words: Energy saving and emission reduction, Industrial organization structure, Economies of scale, Mechanism, Measures

1. Introduction

With problems of energy wastage and environmental pollution that are becoming increasingly serious, how to reduce energy intensity in China is becoming the hot topic of academic research. Energy efficiency improvement and adjustment of industrial structure were studied to reduce the energy intensity. But in the research industrial structures were limited to industrial composition and efficiency factors limited to technological progress. Some scholars also studied measures of adjustment of industrial

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organization structure, Lu Zhengnan[1], Jiang Jinhe[2], Qi Jianguo[3] suggested measures of eliminating backward production capacities and adjusting the scale of enterprises. Wei Chu[4] argued that trans-regional annexation and reorganization of enterprises within industries should be encouraged to increase industry concentration and produce economies of scale. Cheng Yan et al.[5] suggested the energy consumption standards should be set for every enterprise in various industries, enterprises whose energy consumption were higher than the maximum standard or whose declining rate of energy consumption were lower than the minimum standard should be gradually eliminated in order to improve energy efficiency. Even so, seldom research has been done in regard to the mechanism of adjusting industrial organization structure to promote energy saving and emission reduction, and measures were limited to eliminating backward production capacities in the research.

2. Influencing factors of energy consumption per unit of GDP and their relationships

We begin with ascertaining the factors influencing energy consumption per unit of GDP in the study. Taking former research as reference, we can divide the factors influencing energy consumption per unit of GDP into two categories——direct factors relating to the process of energy consumption and indirect factors acting through affecting the process of energy consumption. Direct factors include energy intensity of sectors (efficiency factors), the proportion of added value of industries (structural factors), household energy consumption. Efficiency improvement comes from technological progress, economies of scale and other causes. Economies of Scale (including Economies of Scale and Agglomeration Economies) refer to benefits coming from the decrease of average cost of product with the increasing output, which means that enterprises can reduce production costs and energy consumption through expanding their production scale. Industrial structures include not only the industrial composition, but also the industrial organization structure and the industrial spatial structure. Indirect factors include the economic development, natural conditions, and so forth. Natural conditions include the macroscopic environment such as the geographical position, the land area, climate, resource endowment of a country, and environmental capacity affecting the location of industries and enterprises from the microcosmic aspect.

The factors which affect energy consumption per unit of GDP are not functioning alone, but interacting with each other, which constitutes the mechanism of energy saving and emission reduction in industries. Indirect factors take effect through direct factors, therefore, we conclude that efficiency factors and structural factors and their interactions determine the energy consumption per unit of GDP. There are three aspects among the relationships between efficiency factors and structural factors.

(1) Relationship between technological progress and change of industrial composition. Technological progress promotes and also benefits from the upgrade of the industrial composition.

(2) Relationship between economies of scale and change of industrial organization structure. Economies of scale, deriving from the expansion of production scale of enterprises, become the motivation and condition for enterprises to expand their production scale and achieve competitive advantages.

(3) Relationship among agglomeration economies, environmental capacity and change of industrial spatial structure. Industries should be located in the areas where environmental capacity and agglomeration economies are appropriate for the development of the industries.

3. Energy saving and emission reduction, economies of scale and adjustment of Industrial organization structure

3.1 Sources of economies of scale

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