

Research on the Influencing Factors of Iron and Steel Carbon Emission Right Trading Price and Trading Mechanisms

Qiyang Shan*, Jiayi Zhang, Ziyi Liu, Xin Guo, Ruoqing Wang

North China University of Science and Technology, Tangshan, Hebei, China.

How to cite this paper: Qiyang Shan, Jiayi Zhang, Ziyi Liu, Xin Guo, Ruoqing Wang. (2023). Research on the Influencing Factors of Iron and Steel Carbon Emission Right Trading Price and Trading Mechanisms. *Advance in Sustainability*, 3(1), 28-32.
DOI: 10.26855/as.2023.12.006

Received: November 28, 2023

Accepted: December 25, 2023

Published: January 22, 2024

Corresponding author: Qiyang Shan, North China University of Science and Technology, Tangshan, Hebei, China.

Abstract

The iron and steel industry is one of the important sources of global greenhouse gas emissions, and carbon emission reduction has become an important challenge for iron and steel enterprises. In order to realize the carbon emission reduction target, many countries and regions have established carbon emission trading markets to guide enterprises to reduce carbon emissions through the carbon emission right trading mechanism. In these trading markets, the price of carbon emission rights is an important influencing factor, which directly affects the emission reduction cost and the economic benefits of enterprises. However, current research on the trading price of iron and steel carbon emission rights is still relatively limited. The special nature of the iron and steel industry, such as high energy consumption and high carbon emission, makes the formation mechanism and influencing factors of carbon emission right trading price different from other industries. Therefore, an in-depth study of the influencing factors and trading mechanism of steel carbon emission right trading price is of great significance in guiding emission reduction decisions of steel enterprises and the policy formulation of the government.

Keywords

Carbon emission right, iron and steel, trading price, trading mechanism

1. Literature Review

1.1 Fundamentals and background of carbon emission right trading

According to the research results, the implementation of carbon emissions trading through the market mechanism can effectively reduce greenhouse gas emissions. According to Ellerman, A. D. and Buchner, B. K. [1], the basic principle of carbon emission right trading is to establish a market in which the right to emit greenhouse gases is traded as a commodity. Firms or countries can receive a certain number of emission reduction allowances which can be used to reduce a certain amount of greenhouse gas emissions.

The origins of this event can be traced back to the signing of the Kyoto Protocol. The goal of this agreement is to fight climate change by reducing greenhouse gas emissions. According to this agreement, developed countries are required to reduce their greenhouse gas emission levels within a specific period.

1.2 Existing studies on the factors influencing the price of carbon emission rights

Coal and crude oil prices directly affect the EU carbon trading price, which is the main factor determined by the energy price factor. This is a very simple issue that does not require much explanation. AguiarConraria Luís [2] conducted an innovative study on multivariate wavelet analysis modeling to explore the relationship between the carbon market and energy prices in

California. The results of the study show that gasoline prices and carbon prices exhibit a negative correlation and remain relatively stable over a 1-year time scale. Meanwhile, carbon prices and electricity prices showed a positive correlation over the same 1-year cycle. According to Gronwald Mark et al. [3] from the perspective of macroeconomic factors, during the global financial crisis, the returns of EUA futures were more influenced by the macroeconomy, which indicates that the carbon price exhibits a higher dependence on the asset returns of the financial market during economic downturns or extreme market conditions.

According to Batten Jonathan A [4], normal temperature changes have no effect on carbon prices in the carbon market, except for extreme weather. This implies that the temperature level itself is not the key factor that affects the carbon price, but it is those unexpected temperature changes that have an impact on the carbon price. This finding is consistent with the idea that climate change leads to greater volatility in carbon prices and increased hedging costs.

Despite the impact of policy factors on carbon prices, Zhou Zhengjun's [5] study found that climate and policy factors do not have a significant impact on carbon prices. Although government policies will have a variable impact on the carbon price, the government does not directly stipulate the carbon price, and it takes some time for the effect of policies to unfold, so the impact of policy factors on the carbon price is not obvious in the short term.

Research on carbon emissions trading mechanism

Hahn and Noll believe that the carbon emissions trading mechanism should be composed of five elements, including the allocation of quotas, the trading method, the monitoring, reporting, and verification (MRV) mechanism, and the punishment and reward mechanism. Only in this case can it be called a perfect carbon emissions trading mechanism. According to Seiji Ikkata, the EU mechanism faced a lot of difficulties and challenges in the early stage of its inception. For example, the equity factor was not fully taken into account in the quota system, resulting in enterprises often receiving more allowances than they actually emitted; in addition, how allowances were allocated changed frequently and too rapidly. These problems have seriously undermined the motivation to reduce carbon emissions.

2. Factors affecting the price of steel carbon emission rights trading

2.1 Energy price factors

Changing relative energy prices can lead to the inter-conversion of different energy demands, as well as the impact of the conversion of total energy revenues into energy. Changes in these two aspects affect the changes in carbon demand, which in turn affects the carbon trading price. Energy is categorized into conventional and clean energy. Steel companies are profitable organizations. There is a negative correlation between the carbon trading price and the price of traditional energy, when the price of traditional energy rises, companies will not be using traditional energy but will look for its substitutes and use less costly energy, and the relationship between the substitutes is complementary.

2.2 Macroeconomic factors

The level of macroeconomic development is the economic basis for the operation of the total carbon emissions trading mechanism, which in turn affects the changes in total carbon emissions. Macroeconomic development is driven by various industries, in which the iron and steel industry as a major carbon emission industry has a non-negligible role in driving macroeconomic growth. First of all, with macroeconomic growth, the industrial output value increases, and the total amount of carbon dioxide consumption by enterprises increases with the increase in production, leading to an increase in the demand for carbon emissions in the carbon emissions trading market, in the supply of the same situation, the price of carbon rises; on the contrary, the price of carbon dioxide will fall.

2.3 Environmental factors

Although the carbon emissions trading mechanism is often referred to as the carbon market, carbon dioxide is far from the only greenhouse gas. There are many types of greenhouse gas emissions in the atmosphere, most of which are likely to be far more global warming than carbon dioxide. For example, there are other greenhouse gases, usually emitted as methane (CH₄), that have 28 times the global warming potential of carbon dioxide. In other words, 28 units of CO₂ emissions are equivalent to one unit of methane. As a result, carbon markets typically trade in units of carbon dioxide equivalent (CO₂e), which converts the GHG effects of other gases into carbon dioxide so that multiple GHGs can be taken into account in calculations.

2.4 Policy factors

At present, there are two main policies for low-carbon emission reduction in China's iron and steel industry.

One is to compress steel production. The Ministry of Industry and Information Technology seeks to further promote the reduction of steel production and gradually establish a mechanism to limit holdings based on carbon emissions, pollutant emissions,

and total energy consumption.

The second is to implement a carbon quota system. The Ministry of Industry and Information Technology (MIIT) and the Ministry of Ecology and Environment (MOE) have indicated that they intend to include the steel industry in the carbon and limited trading markets. Due to the specific method of a large number of quotas historically, some bond quotas, and steel operations always reduce the energy of the heart, while carbon emissions bring more comfortable steel money for these victims.

3. China's iron and steel carbon emissions trading problems and solution measures

3.1 Existing problems

(1) The standard carbon emission rights market has not yet been formed

Carbon emissions rights trading is an environmental economic system that has emerged in recent years, which promotes China's ecological construction using a specific price. Looking at China's development process, we find that China is still in the early stage of carbon trading, has not formed a real sense, can be compatible with the world standard of national carbon trading market, and is still in a "passive" state. At present, the carbon trading system of China's iron and steel industry is not sound enough, and the carbon trading market is not standardized enough.

(2) Shortage of accounting personnel for CCERs

"Carbon Emission Rights + Accounting" on the demand for multidisciplinary composite talents, but due to the accounting scholars of carbon emission aspects of the relevant training is insufficient in China's iron and steel enterprises, there are few people who have a certain understanding of carbon emission rights, which on the one hand to China's iron and steel enterprises has brought about a great impediment to the efficient development of this aspect of the company, to the company's management and our financial science personnel has more demanding requirements.

(3) Lack of perfect trade regulations

From the current development of carbon emission legislation for Chinese steel enterprises, there is a lack of corresponding legislation. Moreover, due to the gradual increase in trading volume, many guidelines are difficult to implement in the current market. On this basis, there is an urgent need to solve important issues involving trading rules, trading models, obligations and rights of trading parties, trading dispute settlement, and trading authority.

(4) Backward technological conditions

A backward technology level will cause a lot of unnecessary cost consumption and serious environmental pollution. Refined technology can accelerate the production efficiency of enterprises and reduce their production costs. Although China's development in iron and steel is relatively mature, the lack of the application of cutting-edge technology, cannot fully achieve energy saving and emission reduction. In the field of iron and steel, backward technology makes the price of China's iron and steel carbon emission rights trading higher than the value of steel itself, which restricts the development of China's carbon emission rights trading mechanism.

3.2 Solution measures

(1) Establish a sound regulatory mechanism for the carbon emissions trading market

First of all, learn from the experience of the European Union and other regions, and combine with China's national conditions to establish China's trading market. Secondly, select a number of economically and technologically developed regions to prioritize the development of carbon emissions as a pilot and then drive the development of carbon emission reduction in less developed regions, establish cooperation with less developed regions, and encourage the less developed regions to actively learn from the advanced technology and improve the equipment, and promote the trading of carbon emission rights; ultimately, after the development of the carbon trading spot market to a certain extent, the launch of the carbon futures market, to form a perfect carbon emission rights trading market system. trading market system. At the same time, the iron and steel carbon emissions trading market should be carried out in a fair and open environment, accept supervision, and reasonably avoid the monopoly phenomenon.

(2) Cultivate relevant accounting talents

Schools should strengthen the cross-fertilization of various disciplines, update their original knowledge structure, in order to better adapt to the requirements of the development of carbon emission rights, and train a group of relevant professionals for the subsequent market demand.

Enterprises need to strengthen the training of accounting personnel in carbon emission reduction, to understand the basic theories and methods of carbon emissions trading, and to effectively deal with carbon emissions accounting affairs when implementing policies related to carbon emissions and the environment.

(3) Establish relevant laws and regulations and improve the legal responsibility system.

A perfect legal system is the guarantee for the healthy and orderly implementation of carbon emissions trading. China should

combine the development of its own country and the development of the whole carbon emissions trading market, absorb the mature experience of other countries, formulate a complete system based on the original theories and practices, strengthen the supervision and management of the market, and make clear the legal status of the carbon emissions auditing organization.

(4) Promote and gradually apply high technology

Enterprises should actively learn from outside experience and encourage enterprises with backward technology or high environmental pollution to actively introduce advanced technology to improve production efficiency, reduce carbon emissions, and increase economic benefits.

4. China's iron and steel carbon emissions trading mechanism

4.1 Quota allocation mechanism

The quota allocation mechanism explores two aspects, namely, how to allocate and how much to allocate.

4.1.1 How to allocate

Free allocation: The government directly issues free of charge to the emission control enterprises.

Paid allocation: The government conducts an auction of carbon quotas, and the enterprise with the highest bid gets the carbon quota.

Fixed price method: Enterprises buy carbon quotas at a fixed price.

4.1.2 How much is allocated

(1) Historical Emission Method: A method of determining carbon emission quotas for future years based on the carbon emission data of a certain year in the past for units included in the quota management.

(2) Historical Carbon Intensity Reduction Method: Between the historical emission method and the industry benchmark method, it refers to the calculation of the allocation of quotas based on the product output, historical intensity values, and emission reduction coefficients of the emitting enterprises. That is, the enterprises themselves make vertical comparisons.

(3) Industry Baseline Method (also known as Benchmarking Method): It refers to the method of determining the carbon emission quotas for the future years of the quota management units by taking the carbon emission efficiency benchmarks of the units included in the quota management as the main basis. That is a horizontal comparison with enterprises in the industry [6].

4.2 Trading Methods

The transaction can take the agreement transfer one-way bidding or other ways in line with the provisions [7], at present, China's carbon market mainly adopts the agreement transfer and one-way bidding these two ways. Agreement transfer refers to the negotiation between the two parties to reach an agreement and complete the transaction through the relevant trading system, including listed agreement transactions and block agreement transactions. One-way trading refers to the quota transferor (i.e. seller) submitting a declaration to the trading organization and determining the quantity of quota to be sold and the reserve price, and the intended transferee (i.e. buyer) bidding on its own and completing the transaction within the stipulated time.

4.3 Monitoring, Reporting and Verification Mechanism (MRV)

The MRV system mainly consists of three parts: monitoring, reporting, and verification. Monitoring refers to the implementation of the monitoring plan reported by the enterprise in the previous year, including data monitoring, cell phones, carbon emission factor measurement, etc. Reporting refers to the reporting of the results of the previous year's carbon emissions and the current year's monitoring plan to the relevant departments; Verification refers to the organization of verification agencies by the relevant departments to verify the report of the enterprise.

4.4 Penalty and Incentive Mechanism

(1) Incentive mechanism

Iron and steel carbon emissions incentive mechanism refers to the enterprise unit carbon emissions level being better than the baseline, equivalent to a surplus of carbon allowances, this part of the quota can be converted into corporate profits through reasonable trading, that is, a kind of incentive for enterprises. This incentive mechanism can effectively drive iron and steel enterprises to actively and orderly join the ranks of energy conservation and environmental protection, so as to achieve the purpose of carbon reduction and emission reduction.

(2) Penalty mechanism

Iron and steel carbon emissions in excess of the emissions quota, it is controlled by tier pricing, that is, the emissions are divided into several levels, in accordance with the corresponding level of pricing, as the name suggests, the more emissions, the higher the price.

Funding

This paper is supported by the North China University of Science and Technology: Research on the Influencing Factors of Iron and Steel Carbon Emission Trading Price and Trading Mechanisms (No.: T2023169). Project advisor (Teacher): Hongxia Wu.

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