Policy Research on China’s Carbon Market Regulation Mechanism

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Abstract. Reasonable carbon market regulation mechanism can guide the efficient operation and development of carbon market. Content analysis is used to sort out and select relevant policy texts of carbon market regulation mechanism, through the two dimensions of carbon market regulation policy tools and carbon emission reduction, and analyzes the two paths of our government's regulation of carbon market, namely quantity regulation and price regulation. The results show that the adjustment measures of carbon emission quantity are specific and comprehensive, the adjustment measures of carbon emission price are relatively general and scarce. Some suggestions are put forward 1) Co-ordinating carbon emission quota indicators, formulating unified industry standards and trading mechanisms. 2) Improve the relevant policies, laws and regulations and system design of China's carbon market, and create a good carbon market trading environment. 3) Increase the carbon price control policy.

Introduction

By April 19, 2019, The eight carbon trading pilots projects totaled 168.78 million tons and 3.66 billion yuan in transactions. Among them, Shenzhen was the first city to pilot carbon trading. Although hubei’s carbon trading pilot started later, it was more active than other trading pilots, with the largest transaction volume and total transaction volume, and the corresponding market share was heavier. However, on the whole, due to the good price mechanism has not yet been formed, the market activity of the eight carbon trading pilots is generally low. During the operation of carbon trading in China, the carbon price fluctuates greatly, and there are obvious differences among the pilot sites. For example, the lowest carbon price in Shanghai is 4.2 yuan, and the highest is 48 yuan, carbon price fluctuates greatly, and the fluctuation trend is obvious, while the lowest carbon price in Hubei is 10.81 yuan, and the highest is 25 yuan, and carbon price fluctuates greatly small. Such obvious difference in carbon price market leads to unreasonable allocation of carbon emission quota and imbalance of equity in China, which leads to low efficiency of carbon market operation and unclear market development. Therefore, the government should make appropriate adjustment, guide the market trend and promote the active development of the market.

Literature References

Scholars at home and abroad have carried out a lot of research on the policies of carbon market regulation mechanism. Among them, carbon price and regulation mechanism, Du Ziping, Zhao, Hong Juan, etc. put forward macro-economic development, industrial development level, exchange rate [1], research and development of emission reduction technology, market system, national policy [2], and government price limit [3]. On the research of quota allocation and regulation mechanism, Li proposed to predict the trend of carbon price through government regulation [4]. Taschini believes that competitive auction is conducive to the development of competition mode, improve market operation efficiency and ultimately achieve the government's emission reduction goals [5]. The above literature focuses on the analysis of the impact of economic development, carbon emission price changes and quota allocation on carbon trading, ignore the impact of national policies on carbon markets. Based on this, this paper combs the relevant policy texts of carbon market regulation issued by the Chinese government, analyzes the regulatory policy structure, in order to provide support for the construction and improvement of China's carbon market.
Empirical Analysis

Research Methods and Sample Sources

The content analysis method is used to measure and analyze the relevant policies of carbon market quantity regulation and price regulation issued by the Chinese government. According to the authority, openness and relevance of the text, the relevant policy texts of the carbon market regulation mechanism are selected as samples, search on the official websites such as the national development and Reform Commission, the national science and Technology Commission, China carbon emissions trading network, and through careful reading and screening, 15 policy texts of carbon market quantity regulation and price regulation are finally obtained.

Policy Analysis Framework of Carbon Market Regulation Mechanism

Based on the perspective of policy tools to study and analyze the policy text content of China's carbon market regulation mechanism. For the X dimension: carbon trading regulation policy tools, using Rothwell and zegveld's classification, the carbon market regulation mechanism policy tools into three types: supply type, environment type and demand type. For Y dimension: carbon market emission reduction, according to the emission reduction attributes of China's carbon market, it is divided into three sub attributes: investment intensity, R & D intensity of science and technology, and low-carbon production. The above 15 policy samples of China's carbon market regulation mechanism are sorted out and classified, and the two-dimensional analysis framework of carbon market regulation mechanism policy is obtained as shown in Figure 1.

Content Analysis Code of Policy Text

Encode the relevant policy documents of carbon market quantity regulation and price regulation issued by the above 15 countries and the relevant terms in each policy text, classify the policy text according to the two-dimensional analysis framework of carbon market regulation mechanism established in Figure 1, and get 113 specific terms.

Descriptive Statistics

According to different dimensions and keywords, the above 15 policy samples and 113 relevant policy clauses were searched, as shown in Figure 2.
Figure 2. Frequency of policy tools used in carbon market regulation mechanism in X dimension.

Through frequency statistical analysis, it can be seen that among the 113 policy instruments, the largest is request free carbon quota regulation terms, with 29 clauses in total; the second is the government's planned carbon emission quota target and the regulation clauses related to the enterprise's voluntary emission reduction management measures, with 23 and 20 clauses respectively, by adjusting the carbon price and emissions of carbon tax regulation, government increased carbon technology research and development of software and hardware construction, government subsidies, carbon markets investment subsidies reduction enterprise class also is more, there were 7, 9, 6, 8. There are fewer policy tools such as carbon quota repurchase by government finance and carbon price control outside the system of government institutions, including 3 and 4 respectively. There are only 2 policy tools, including strengthening the price early warning mechanism and controlling carbon trading through reserved quotas. It can be seen that China's government's regulation and control of carbon market is mainly through quantity regulation and price regulation. Among them, China's government has more measures to regulate the quantity of carbon trading and less price regulation. At this stage, China's government's regulation and control of carbon market mainly relies on the mandatory provisions of policies and regulations, followed by the construction of a healthy environment of carbon market according to the carbon emission target and the strengthening of enterprises' awareness of independent emission reduction, guide the development of carbon market.

Through the analysis of the two-dimensional frequency data in table 1, it can be seen that the current regulation and control of carbon market in China tends to provide a good market environment for carbon trading subjects to achieve the purpose of carbon market and reasonable operation. From the perspective of carbon trading regulatory policy tools, the government attaches great importance to the free issue of carbon quotas required by laws and regulations, the government's planned carbon emission targets and the management methods of enterprises' voluntary emission reduction, with 29, 23 and 20 policies, respectively. From the perspective of carbon market emission reduction attributes, there are no significant differences in scientific and technological research and development, low-carbon production and investment, with 39, 28 and 46 policies, respectively, comparatively speaking, the government's investment in carbon market development regulation is large, but the result of low-carbon production is not ideal. Therefore, the
government's regulation of carbon market is mainly reflected in the quantity regulation of quota distribution and technical support. At present, the national carbon market is not perfect and is still in the stage of development and construction.

Table 1. Two dimensional frequency distribution based on X-Y analysis for carbon market regulation in China.

| X/Y                                                                 | Technology research and development | Low carbon production | Investmen t intensity | Total |
|---------------------------------------------------------------------|-------------------------------------|-----------------------|----------------------|-------|
| Free carbon quota required by laws and regulations                  | 12                                  | 3                     | 14                   | 29    |
| Hardware and software construction of carbon market                 | 2                                   | 1                     | 3                    | 6     |
| Regulate carbon price and carbon emission by adjusting carbon tax  | 1                                   | 3                     | 3                    | 7     |
| Measures for the administration of enterprises' voluntary emission reduction | 3                                   | 5                     | 12                   | 20    |
| Strengthen price early warning mechanism                            | 0                                   | 2                     | 0                    | 2     |
| Carbon trading control through reserved quota                        | 0                                   | 2                     | 2                    | 4     |
| Carbon quota repurchase by government finance                       | 1                                   | 0                     | 2                    | 3     |
| Government plans carbon emission targets                            | 11                                  | 8                     | 4                    | 23    |
| Government invested funds to subsidize emission reduction Enterprises | 3                                   | 1                     | 4                    | 8     |
| Government increases subsidy for research and development of carbon emission technology | 6                                   | 1                     | 2                    | 9     |
| Regulating carbon price outside the government system                | 0                                   | 2                     | 2                    | 4     |
| Total                                                               | 39                                  | 28                    | 46                   | 113   |

In order to build a comprehensive and perfect carbon market operation mechanism, based on the above research analysis and conclusions, this paper puts forward several suggestions: 1) coordinate carbon emission quota indicators, and formulate unified industry standards and trading mechanisms. A unified distribution standard can eliminate the differences between the carbon pilots as much as possible and accelerate the establishment of a unified carbon market nationwide. 2) improve the relevant policies, laws and regulations and system design of China's carbon market, and create a good carbon market trading environment. 3) increase carbon price control policies. Carbon price plays an important role in the development and management of carbon market, which directly affects the sound development of carbon market.

Summary

By analyzing the descriptive statistical data above, it can be concluded that China's regulation of carbon market is mainly reflected in quantity regulation and price regulation, at present, while quantity regulation mainly relies on environmental policy tools, and the government is inclined to provide a good development environment for market trading, by formulating the target planning of carbon market trading and emission reduction, the government issues laws and regulations on the number of quotas to achieve In order to control the development of carbon market reasonably. From the two-dimensional frequency distribution table based on X-Y analysis, it can be seen that quota regulation clauses account for a large proportion in all kinds of policy tools, but they are relatively rare compared with the government regulation clauses on carbon price, which shows that the Chinese government attaches great importance to the free development of carbon market trading, reasonably allocates carbon quotas according to the economic and emission reduction capacity, and provides advanced science, technology and information support for efficient emission reduction. It is conducive to improving the development of carbon market in essence, but the carbon price supervision system needs to be improved. In general, the current policy structure of China's carbon market regulation mechanism mainly focuses on the construction of carbon market trading framework and emission reduction technology, supplemented by laws and regulations management, and fundamentally regulates carbon market quota and price by means of infrastructure construction, science and technology, information support, etc.
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References
[1] Du Z P, Liu F C. Impacts on the price of regional carbon emissions based on GA-BP-MIV model, J. Price: Theory & Practice. 38(06) (2000) 42-45.
[2] Zhao X, Zou Y, Yin J, et al. Cointegration relationship between carbon price and its factors: evidence from structural breaks analysis, J. Energy Procedia. 142 (2017) 2503-2510.
[3] Hong J, Chen J. An analysis of the factors influencing the price of carbon trading market in China, J. Price: Theory & Practice. 12 (2019) 65-66.
[4] Li C Y, Chen S N, Lin S K. Pricing derivatives with modeling CO₂ emission allowance using a regime-switching jump diffusion model: with regime-switching risk premium, J. Journal of Cleaner Production. 10 (2016) 887-908.
[5] Luca Taschini. Environmental Economics and Modeling Marketable Permits, J. Asia-Pacific Financial Markets. 17(4) (2010) 325-343.