

Study on the Effectiveness of CCER Mechanism in Serving the Carbon Emissions Trading Market

Huanhuan Sun^{1, *}, Rui Zhou², Jianfeng Zhu¹

¹ School of Finance, Anhui University of Finance and Economics, Bengbu, Anhui, 233030

² School of Accountancy, Anhui University of Finance and Economics, Bengbu, Anhui, 233030

*Corresponding Author: 207890347@qq.com

ABSTRACT

Based on the relevant data of China's carbon emissions, this study explores the development status and impact effect of the CCER (China Certified Voluntary Emission Reduction) mechanism in the carbon emissions trading market, reflecting a high degree of professionalism. The study points out that the CCER mechanism, as an important part of the carbon trading market, effectively promotes the activity of the carbon market and the realization of the carbon emission reduction target by incentivizing enterprises to voluntarily reduce emissions and purchase certified emission reductions (CERs) to offset part of the carbon emission quotas. With the gradual promotion of policies and the improvement of market mechanisms, CCER mechanism shows a development path from pilot to full promotion, from voluntary to gradually mandatory. Through data analysis, we find that the price of CCER market is influenced by a variety of factors, including policy orientation, market demand and supply situation. Based on the above research, we put forward corresponding policy recommendations.

KEYWORDS

CCER mechanism; Carbon emission rights; Trading market; Effectiveness

1. INTRODUCTION

Actively responding to the problem of global climate change and striving to achieve carbon emission reduction through carbon emission rights trading has become the consensus of the international community. In order to achieve carbon emission reduction and solve the problem of greenhouse gas emissions, China has accelerated the pace of the construction of the carbon emission rights trading market, and formally launched the construction of the national carbon trading market at the end of 2017. Compared with the carbon market in developed countries in Europe and the United States, the construction of China's carbon market started late and from a low starting point, in which the carbon emissions trading market as the core of carbon emissions trading in the construction of the carbon emissions trading market is more than a lack of certain theoretical and practical experience, so it is particularly important to study the development of China's carbon emissions trading market around the construction of China's carbon emissions trading market, CCER mechanism, as a financial derivative of the carbon emissions rights, is the key to the carbon emissions trading market Complementary. This project takes the carbon emission right trading market as the research object and devotes itself to finding the general mechanism and development path of CCER mechanism in the process of optimizing the carbon emission right trading market, so as to promote the benign development of each carbon emission market, in order to realize the green and high-quality development of the national economy and green transformation in the real sense.

2. LITERATURE REVIEW

In the process of globalized economic development, more and more scholars have studied the relationship between economic growth and carbon emissions, and have come up with certain theoretical results. Shen Meng et al. (2012) constructed a theoretical model of technological progress, economic growth and carbon emissions, and comprehensively examined the relationship between the three. The analysis concludes that technological progress can achieve both economic growth and specific conditions for carbon emission reduction. Qi Shaozhou et al. (2015) synthesized various methods and used the long panel data of six central provinces to conclude that all provinces have crossed the peak of carbon intensity, but are far from exceeding the peak of carbon emissions. Wang (2012) constructed a nonlinear relationship model between carbon emissions and economic growth, and 2018 Nobel Prize laureate for economics Nordhaus also lies in the study of the relationship between economic growth and climate change.

Xiong Ling and Qi Shaozhou (2012) systematically analyze the structural defects of the European Union's carbon emissions trading system, institutional changes and their impacts, and point out that the EU-ETS mainly suffers from a series of problems such as market inefficiency caused by the decentralized limitation of the total amount of member states. In addition, Chen Wei and Song Weimin (2014), Perthuis and Trotignon (2014), Wang Luyang and Wei Qingpo (2016), etc. have made reference to the experience of the EU market for the construction of China's carbon market. They concluded that a carbon emissions trading market needs to be established in a gradual and phased manner. The principle of common but differentiated responsibility is applied among provinces. Numerous scholars have summarized their experiences and proposed certain paths for the development of carbon financial markets in various provinces.

Among the various policies to control greenhouse gas emissions, the economic stimulus represented by carbon pricing mechanism has the characteristics of good flexibility and sustainability, and is favored by various countries. Carbon pricing mechanism is generally categorized into carbon tax and carbon emissions trading system. Among them, carbon tax mainly aims to reduce fossil fuel consumption by taxing coal combustion and fossil fuel products such as gasoline, aviation fuel, and natural gas. Hu Xiaoyu (2023) points out that because the carbon emissions trading system has the characteristics of certainty of emission reduction results and higher efficiency of emission reduction, more and more countries and regions choose to use it as the main policy instrument to reduce carbon emissions. Since the entry into force of the Kyoto Protocol, the carbon market has developed rapidly, and countries and regions have begun to establish intra-regional carbon markets to achieve the goal of carbon emission reduction commitments. However, the carbon market is in the early stage of development, Cao Weiwei (2023) pointed out that the financial mechanism to support the flow of China's carbon market has not yet been established, and the carbon financial market has not effectively guided the participation of investment institutions and other subjects in the carbon market. In contrast, the carbon market in the European Union has developed in a highly developed financial market environment, and carbon financial products and services including futures, forwards, options, and swaps have been synchronized at the early stage of the carbon market.

Based on the above literature, we can find that some scholars have reached a consensus on low carbon emissions for economic growth, and have clarified the possibility of low carbon for the development of financial market. It is pointed out that the carbon emissions trading market is of great significance in realizing carbon emission reduction, but the carbon emissions trading market is in the pre-development stage, and the feasible means to promote the development of the carbon emissions trading market are not explicitly put forward. Another part of scholars pay attention to the degree of regional linkage of carbon emissions, and start from China's provinces and regions to make a comparative study. However, they only stay at the level of recognizing and clarifying the relationship between the two, and do not propose where to start to effectively deal with this issue. At present, there is little research on the use of carbon credit mechanism to promote the development of carbon

emissions trading market in China, and there is still much room for expansion based on the empirical data of relevant panel data of provinces in China to comprehensively analyze the path of using carbon credit mechanism (CCER) to promote the development of carbon emissions trading market. In addition, the scope of the carbon credit mechanism needs to be further developed.

Carbon credit mechanism (CCER) is an important supplement to the carbon market, 2017 carbon credit mechanism (CCER) project filing and approval suspension, and from the current market calls, carbon credit mechanism (CCER) restart is very conducive to the promotion of carbon neutrality, is conducive to the activation of the carbon financial market. With the continuous promotion of China's "dual-carbon" strategy, carbon emissions trading has become an important environmental policy to promote the realization of China's "dual-carbon" goal, but it still faces many problems in its development. This project researches the development path and general mechanism of CCERs serving the carbon emissions trading market based on provincial panel data, and explores how CCERs, as financial assets and financial instruments, can improve the liquidity, marketability and trading enthusiasm of the carbon market, and thus promote the development of the carbon emissions trading market. Through the literature and other investigations, it is found that China's current CCER projects are mainly focused on new energy and renewable energy projects, and more project types are yet to be developed in order to give full play to the potential of carbon emission reduction.

3. DEVELOPMENT OF CHINA'S CARBON MARKET

In recent years, China's carbon market has shown a vigorous development trend, with both carbon emission right quotas and carbon prices showing a steady increase, and the market activity has also increased significantly. With the clarification of the country's carbon emission reduction targets and the continuous improvement of policies, more and more enterprises have been included in the carbon trading market, and carbon quotas have become one of the important assets of enterprises. Table 1 shows the trend of CCER price and carbon market carbon emissions trading volume from December 2021 to May 2024, from which we can see that the carbon price is on a steady upward trend. At present, the national carbon market is actively exploring the expansion of industry coverage and the innovation of trading mechanism from December 2021~May 2024, the carbon market carbon emissions trading volume in general shows an upward trend.

Table 1. Data table of CCER price and carbon market carbon emission trading volume (2021.12 - 2024.5)

Date	Bid price (yuan)	Mid price (yuan)	Sell price (yuan)	Volume: Carbon Market Carbon Emission Allowance (CEA) (tons)
2021.12	39.78	40.68	41.57	135557640
2022.01	36.2	38.62	41.03	7862464
2022.02	43.96	45.96	47.95	1670615
2022.03	46.40	48.50	50.60	708554
2022.04	53.24	55.82	58.40	1450528
2022.05	57.67	59.93	62.20	2255149
2022.06	57.83	59.42	61.00	770290
2022.07	61.27	63.33	65.40	1091990
2022.08	60.13	62.27	64.41	547987
2022.09	62.10	64.45	66.80	10810
2022.10	57.97	59.72	61.47	969746
2022.11	60.40	62.03	63.67	7298372
2022.12	56.90	58.08	59.27	26252988
2023.01	57.20	58.30	59.40	257400
2023.02	57.20	58.20	59.20	1854306
2023.03	57.15	58.28	59.40	1307603
2023.04	55.25	56.73	58.20	1052657
2023.05	54.03	57.05	60.07	1231834
2023.06	53.19	54.65	56.12	2302461
2023.07	54.46	55.23	56.00	3009261
2023.08	55.29	58.10	56.70	13397711
2023.09	59.74	61.29	62.84	35575171
2023.10	64.34	65.21	66.08	93051321
2023.11	67.92	68.89	69.86	40432288
2023.12	63.73	65.33	66.93	18471755
2024.01	61.22	63.34	65.46	3016246
2024.02	61.63	64.53	67.43	2406026
2024.03	63.90	65.43	66.96	3192987
2024.04	66.48	68.84	71.2	6525368
2024.05	78.15	81.41	84.66	2881494

4. CCERS HELP COMBAT CLIMATE CHANGE IN ORDER TO PROMOTE ECOLOGICAL CIVILIZATION CONSTRUCTION

The relationship between CCERs (China Certified Voluntary Emission Reductions) and electricity consumption is mainly reflected in the interaction between carbon emission reduction and clean energy consumption. As global concern over climate change deepens, reducing greenhouse gas emissions has become a common goal for all countries. In this context, CCER, as a carbon credit mechanism, encourages enterprises to offset their own carbon emissions by implementing emission reduction projects. As one of the main sources of carbon emissions, the power industry's electricity consumption is directly related to the amount of carbon emissions.

By purchasing CCERs, power-consuming companies can offset their carbon emissions from power consumption to a certain extent. This mechanism provides flexibility for companies by allowing them to participate in carbon reduction actions through economic means without directly reducing their electricity consumption. This is particularly important for companies that find it difficult to

immediately reduce their electricity demand but wish to fulfill their carbon reduction responsibilities. The existence of the CCER mechanism also promotes the development and consumption of renewable electricity. Renewable power, such as wind power and solar power, is characterized by zero or low emissions, which is an effective way to reduce carbon emissions from the power industry. The figure reveals the trend of China's power consumption from 2016 to 2024. From the figure, we can see that although the power shows an upward trend, the year-on-year growth rate shows a downward trend, which indicates that the growth of power consumption reflects the requirements of China's development of power but with the establishment of the CCER mechanism promotes the development of renewable energy power is power consumption has slowed down. the CCER mechanism by providing economic incentives for renewable energy projects, encouraging more enterprises to invest in the development of renewable energy, so as to increase the supply of renewable energy power, reduce the overall carbon emission intensity of the power industry. With the advancement of the Electricity-Carbon Synergy mechanism, the relationship between CCERs and electricity consumption will become even stronger. Electricity-carbon synergy aims to realize an effective connection between the electricity market and the carbon market, encouraging enterprises and individuals to choose cleaner and lower-carbon energy consumption methods through price transmission and synergy of carbon emission accounting. Under this mechanism, power consuming enterprises purchasing CCERs can not only offset carbon emissions, but also further reduce their own carbon emissions by choosing green power. At the same time, renewable energy power producers can also earn additional revenue by selling CCERs and green power, thus incentivizing them to increase the production and supply of renewable energy power.

5. CCERS PROMOTE GREEN AND LOW-CARBON ECONOMIC TRANSFORMATION

By providing economic incentives for emission reduction projects, CCERs encourage companies to invest in the development of low-carbon projects such as renewable energy and forestry carbon sinks. These projects not only help reduce greenhouse gas emissions, but also promote the optimization of energy structure and the development of green low-carbon industries. With the rise and growth of low-carbon industries, new economic growth points will be formed and the transformation and upgrading of economic structure will be promoted.

For enterprises that need to fulfill their emission reduction responsibilities, CCERs provide a flexible way to reduce emissions. By purchasing CCERs to offset part of their carbon emissions, enterprises can accomplish their emission reduction targets at a lower cost without affecting their normal production and operation. This helps to reduce the cost of emission reduction and improve the economic efficiency and market competitiveness of enterprises. 2016-2022 China's GDP China's economy is showing a steady development stage, which cannot be separated from the steady advancement of the green and low-carbon economic transformation.

6. SUGGESTIONS

The CCER (China Certified Voluntary Emission Reduction) mechanism, as an important tool for promoting green and low-carbon development, has a significant role in promoting economic development. In order to further develop the CCER mechanism, the following are some suggestions:

6.1. Improve the Policy and Regulatory System

Accelerate the legislative process: Promote the legislative work of the “Law on Combating Climate Change and Carbon Neutrality”, incorporate the CCER mechanism into the legal framework, clarify

its legal status and operational norms, and provide legal protection for the long-term development of the CCER market.

Improve supporting policies: Introduce a series of supporting policies, such as tax incentives, financial subsidies, financial support, etc., to incentivize more enterprises and individuals to participate in CCER projects, and improve the economic and social benefits of emission reduction projects.

6.2. Expand Market Coverage

Increase the variety of methodologies: Based on domestic advanced technology, compile more CCER methodologies with Chinese characteristics, covering a wider range of emission reduction fields and project types, and improve the supply capacity and level of the CCER market.

Promote industry expansion: Include more high-carbon emission industries in the coverage of the carbon market, gradually expand the application fields and demand scale of the CCER market, and promote the prosperous development of the CCER market.

6.3. Strengthen Market Supervision and Services

Establishment of regulatory mechanism: Establish and improve the regulatory mechanism of the CCER market, strengthen the regulation of emission reduction project auditing, emission reduction certification, trading behavior, etc., and ensure the fairness, impartiality and transparency of the CCER market.

Enhance service capacity: Strengthen the construction of CCER market service system, provide convenient and efficient registration, transaction settlement, information disclosure and other services, and reduce the transaction cost and time cost of market participants.

6.4. Promote the Innovative Development of Carbon Finance

Enrich trading varieties: On the basis of CCER spot trading, explore the development of CCER futures, options and other derivatives trading, so as to enrich the trading varieties and levels of the carbon financial market and meet the diversified needs of market participants.

Introduce financial institutions: Encourage financial institutions such as banks, insurance companies and funds to participate in the CCER market, develop carbon financial products, and provide services such as carbon asset management and carbon consulting, so as to provide financial support and guarantee for the development of the CCER market.

6.5. Strengthen International Cooperation and Exchange

Participate in the formulation of international standards: Actively participate in the formulation of standards related to the international carbon market, promote the convergence of China's CCER standards with international standards, and improve the recognition and influence of China's CCERs in the international carbon market.

Strengthen international cooperation: Strengthen cooperation and exchange with the international carbon market, promote the trading and circulation of China's CCER projects in the international carbon market, and attract more international investors to participate in China's CCER market.

ACKNOWLEDGMENTS

This research was supported by Anhui University of Finance and Economics Provincial College Students Innovation and Entrepreneurship Training Program Project (Grant No.: S202310378100).

REFERENCES

- [1] LU Su, TANG Jiabin, XIONG Jiao. Fiscal decentralization and agricultural surface pollution: spatial spillover and threshold characteristics [J]. Journal of Central South University (Social Science Edition), 2022, 28(06):67-77.
- [2] Lin Zeyong. Research on supply chain carbon emission reduction strategy under carbon emission reduction policy and product promotion [D]. Southwest Jiaotong University, 2021.
- [3] Guan Zhigui. Research on the role mechanism and optimization path of China's carbon emissions trading mechanism [D]. Shenzhen University, 2019.
- [4] HU Xiaoyu, CAO Weiwei, QIN Zhen, et al. Research on the status quo of domestic carbon emissions trading market [J]. China Survey and Design, 2023, (S1):64-68.
- [5] LI Ping, RAO Zewei. Current status of research on major issues of carbon trading [J]. Journal of University of Electronic Science and Technology (Social Science Edition), 2021, 23(05):12-23.
- [6] WENG Zhixiong, MA Zhong, LIU Tingting. Current Situation, Challenges and Countermeasures of China's Carbon Market under the Carbon Neutrality Target [J]. Environmental Protection, 2021, 49(16):18-22.
- [7] Wen Mengyao. Current Situation and Development Trend of China's Carbon Trading Market [J]. China Money Market, 2023, (04):71-75.