

Exploration of the Initial Allocation Scheme of Carbon Emission Rights in China: International Experience and Policy Implications

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Abstract: Along with the continuous development of the pilot carbon trading market and the construction of a uniform CET market, it is essential to establish a reasonable allocation method for carbon emissions consistent with the development of the CET market in China. The reasonable allocation of carbon allowances is a key means to ensure the efficiency of the carbon emission trading system. China's carbon emission trading market is still in its initial phase, and there are still some problems to be improved in terms of carbon quotas. This paper compares the allocation system of China's carbon emission rights with that of the international carbon emission rights allocation system. It compellingly explores China's carbon emission right allocation system in recent years. Based on the strict baseline requirements, the paper makes innovative proposals to allocate carbon emission allowances based on auction allocation, supplement them with free distribution, and provides reasonable suggestions for developing the trading market of carbon emission rights in China.

Keywords: carbon neutrality, carbon emission rights, trading markets

1. Introduction

At the end of 2017, the national unified CET market was launched in China. As the largest developing country in the world, its particularity and diversity are worthy of in-depth study if it wants to establish a national unified carbon market [1] successfully. Optimizing the allocation mechanism of the carbon quota is one of the most essential approaches to realizing "double carbon", and a key measure to gain the pricing power of international carbon emissions [2].

Carbon quota trading refers to the fact that when an enterprise's carbon emissions are above or below the established carbon quota, the difference part shall be traded in the CET market to reduce emissions throughout the economy most cost-effectively and promote the smooth operation of the carbon trading market [3]. In the CET market, the allocation of carbon quotas is divided into two parts: free allocation and paid allocation. The Chinese CET market is in its early stages, and the government still has not found a perfect way to allocate emission allowances. With the development of the carbon emission trading system, more scholars believe that free allocation should gradually transition to auction allocation [4]. Although free distribution is feasible, its crucial drawback is that it brings low efficiency to the carbon market. There is a certain degree of uncertainty in free distribution. The trading price is prone to large fluctuations, which cannot provide effective price signals to the carbon

market, resulting in the reluctance of enterprises to enter the carbon market trading quota and the lack of market liquidity, which prevents enterprises from effectively choosing appropriate carbon emission reduction methods and carbon emission reduction [5]. Under the auctioning of quotas, the government can better consider the overall emission reduction target and provide a more stable policy framework so that enterprises can achieve lower cost emission reduction under stable expectations.

The above analysis shows that one of the core issues of China's unified CET market is the allocation mechanism of initial allowances, and how to transition from free allocation to auction allocation is the focus of this paper. Therefore, this paper profoundly and systematically analyzes the establishment and operation effects of the initial allocation system of carbon emission rights in the European Union and the United States, combined with the current situation in China, and puts forward suggestions for the optimization and improvement of China's carbon quota allocation to promote the construction of China's CET market.

2. Development status of China's carbon market

2.1. Current status of carbon quota transactions

Since operating the national carbon market, enterprises have been increasing their awareness of emission reduction, the market is running smoothly and orderly, and the transaction price is rising steadily. Figure 1 shows the monthly transaction status of the domestic carbon market in 2022. The annual amount of the national carbon quota was 50.8895 million tons, and the annual trade volume was 2.814 billion RMB, of which the trading volume in November and December accounted for 66% of the year's total turnover. In December 2022, the cumulative transaction volume of the national carbon market exceeded 10 billion yuan.

Overall, the national carbon market infrastructure is already in shape, and carbon pricing has been brought into play in promoting enterprises to reduce GHG emissions and speed up the green and low carbon transformation.

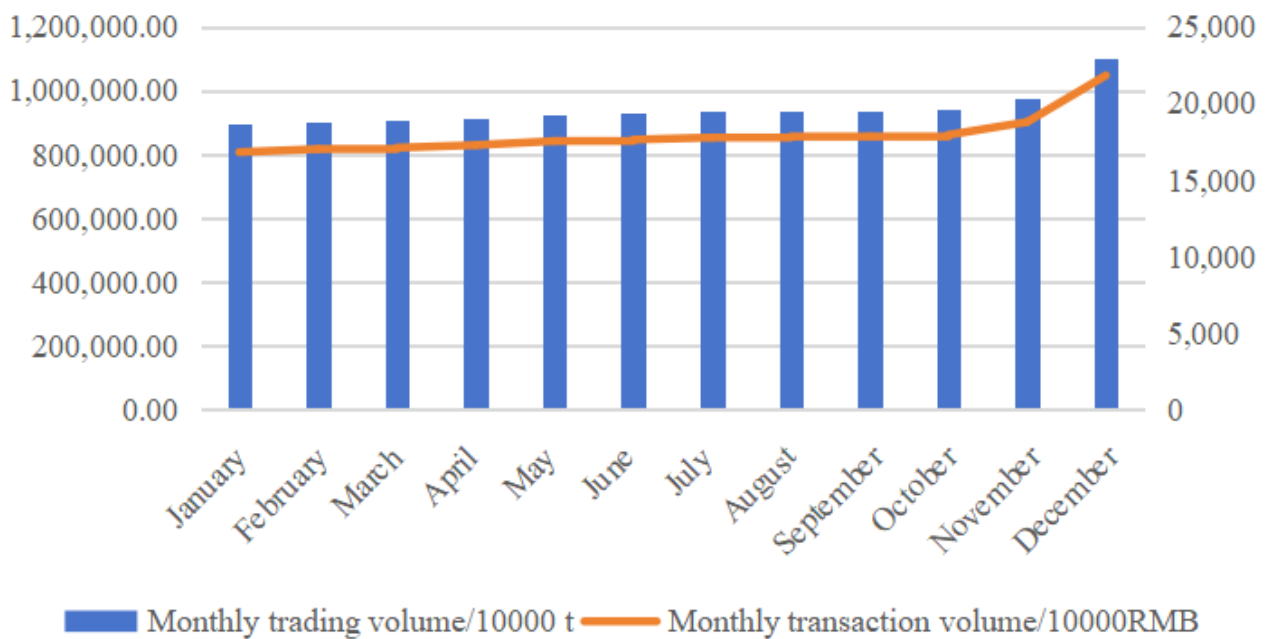


Figure 1: Monthly transactions in the national carbon market in 2022

2.2. Distribution mechanism development status

The free allocation method means enterprises obtain carbon emission allowances through free means, while the paid allocation method requires enterprises to purchase carbon allowances [6]. The free distribution method includes the historical emission and baseline techniques, and the paid distribution includes fixed-price and auction sales. China has launched seven provinces and cities pilot carbon markets, mainly using a free allocation method. Among them, the Carbon Market in Shenzhen is the only pilot carbon market that fully adopts the baseline method, and other pilot carbon markets use a combination of the two ways.

Research has found that the historical emission allocation method is more widely accepted due to its lower data requirements and carbon leakage [7]. However, under historical emissions allocations, carbon-intensive power stations, like coal, get more allowances than low-carbon technologies like natural gas—the problem of excessive profits and distorted investment decisions [8]. Compared with the historical emission allocation method, the baseline method avoids malformed investment decision problems and encourages firms to improve their carbon efficiency [9]. However, more detailed data is required to implement benchmarking, so more effort is needed in data collection.

3. International experience with carbon emission allocation mechanisms

3.1. American experience

The United States operates a quota auction law. The emission rights quota is issued by auction, and the highest bidder gets the emission rights quota. To a certain extent, the auction method makes up for the need for more efficiency and fairness in the historical emission allocation method so that the carbon trading market can effectively distribute emission-reduction resources. However, due to the different qualifications of different enterprises and a series of problems in credit reliability, the application of "auction law" in practice is still relatively lacking.

Carbon Trading Market Can Effectively Distribute Emission Reduction Resources

3.2. EU experience

The EU Emissions Trading System is hailed as the EU's flagship climate change policy and the most extensive carbon trading system in operation. Allocation of the EU carbon trading market adopts a decentralized approach, and the EU does not have an aggregate (cap) initially determined by the EU but a sum decided separately by the 27 member states [10]. Each Member State defines its total emissions and the emission limits of market participants within its own scope, which enter into force after approval by the European Commission. Until now, most allowances have been allocated using the historical emission allocation method.

3.3. Comparative analysis

(1) Set a reasonable total carbon emission. The entire amount control system is an important measure to control carbon emissions. Only by clarifying the total amount of carbon emissions can the regulated industry and related enterprises plan more reasonable carbon emission reduction behaviors. Both EU-ETS and RGGI adopt absolute, complete quantity control. Based on the historical emission data and the previous year as the base year, the total carbon emission in the future is predicted for a certain period, and the emission reduction target is set based on the expected total carbon emission.

(2) Select a reasonable quota allocation method. The distribution method needs to consider the development basis and experience accumulation of the carbon trading market in this region. RGGI adopts the auction-based quota allocation method. On the other hand, EU-ETS allocates carbon

emission allowances free of charge and then gradually auctiones and distributes emission permits to member states pretty and transparently.

(3) Formulate a suitable management model. EU-ETS and RGGI have set up specialized agencies and corresponding testing platforms to monitor and verify the emissions of regulated enterprises. The EU carbon emission trading scheme adopts a centralized and decentralized management model. Establish a central EU authority to approve quota schemes while giving member states flexibility and autonomy. The US has decentralized management. Regional carbon emission organizations or local governments set up their agencies to manage carbon emission trading, which is conducive to reducing conflicts between administrative departments and improving organizational efficiency.

4. Suggestions on China's carbon quota allocation mechanism

They are combined with the experience and lessons of foreign quota allocation, C. With auctions as the dominant carbon emission budget, the revenue from the auction is used to reduce taxes or provide financial subsidies to enterprises. On the one hand, it can achieve better results in terms of efficiency and equity, and on the other hand, it can prove its feasibility through tax cuts or fiscal subsidies. The diagram is shown in Figure 2.

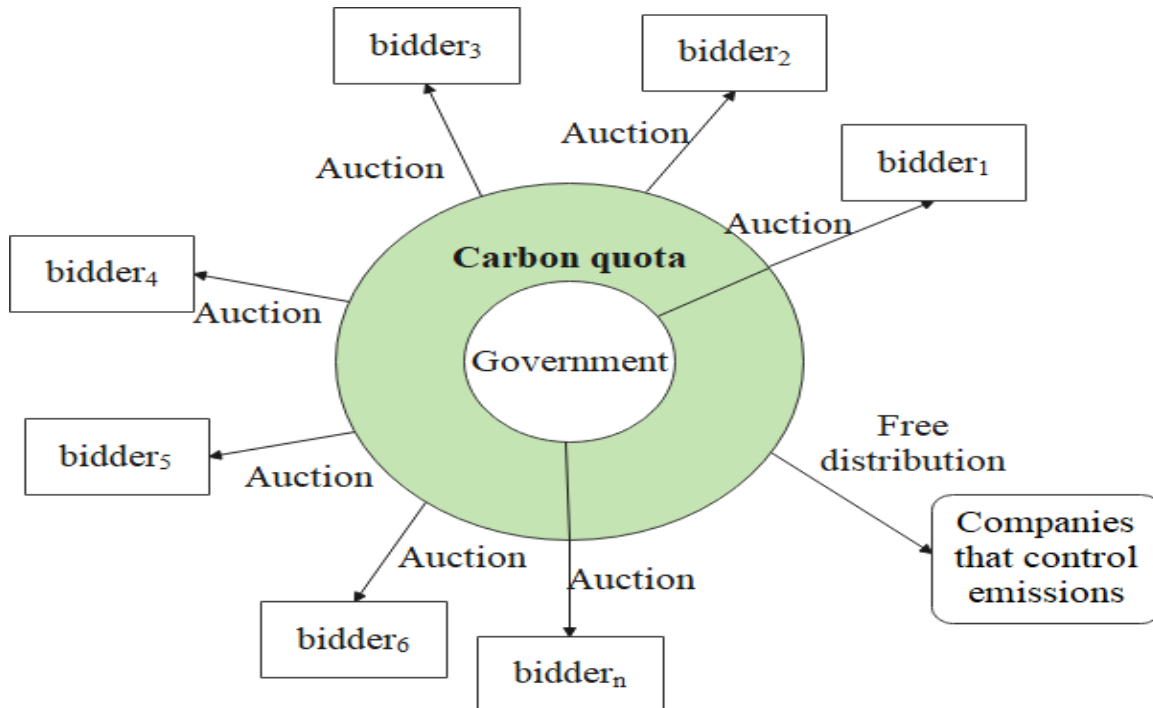


Figure 2: Distribution diagram based on auction and free distribution

Regarding paid distribution, carbon quota auctions are completed through games between bidders and the government and between bidders and bidders. Through the auction, the government can obtain financial revenue to reveal the value of carbon emission rights, encourage enterprises to innovate technologically, and reflect the principles of fairness and justice. Therefore, the proportion of auction methods should be gradually increased. On the other hand, the auction method may produce unfair competition and market manipulation, so it needs strict supervision by government departments. At the same time, the free distribution of carbon quotas is adopted to reduce market competition and enterprises' operating costs. Therefore, in constructing the national unified CET market, we should rationally consider how to distinguish scientifically and rationally choose the appropriate allowances allocation mechanism of the national unified carbon market.

5. Conclusion

To sum up, the initial allowances allocation mechanism is one of the critical problems in the unified CET market in China. Based on a comparative analysis of foreign carbon emission rights allocation methods, the government insists on strict supervision and chooses the auction-based carbon emission rights allocation method supplemented by free allocation as an effective way to improve the efficiency of the CET market. Through auction, a relatively fair market competition environment will be formed, the cost of purchasing emission allowances will be reduced, the initiative and enthusiasm of all walks of life to reduce emissions will be increased, and the cost burden of the industry will be facilitated through free distribution, thus protecting the competitiveness of the industry and forming a carbon emission rights allocation method suitable for China's development.

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