

Development of China's Carbon Finance Market and International Experience

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Abstract. Carbon finance, a crucial component of the carbon market, substantially supports carbon trading and the reduction of carbon emissions. Global carbon market structure has advanced over the past ten years based on experience from around the world. Although China's carbon emission trading system has been initially established, there are still deficiencies in its laws and regulations, trading mechanisms and other aspects. This paper analyzes the current situation and problems of the development of China's carbon finance market in light of the successful experience of the development of mature carbon markets in the international arena, and draws lessons from the experience applicable to China's carbon trading and carbon finance. At present, China's carbon financial market is in a rapid development stage. Many product and system innovations have been made in the process of carbon trading pilot construction, and a series of results have been achieved. Nevertheless, there are still problems such as the lack of carbon market activity, and international experience has brought to the development of China's carbon finance market the experience of establishing rich market participants and clarifying the attributes of carbon finance.

Keywords: carbon emissions trading, carbon financial market, international experience

1. Introduction

Since the establishment of the European Union Emissions Trading Scheme (EU ETS) in 2005, the global carbon market has developed rapidly and the construction of carbon markets has become one of the most important emission reduction tools [1]. As of January 1, 2023, there were 32 carbon markets in operation worldwide, which accounted for 17% of global GHG emissions [2]. The construction of carbon markets will help more and more countries and industrial enterprises achieve their emission reduction targets, and it is increasingly becoming an effective way and powerful tool for national, regional and regionalized organizations to reduce carbon dioxide emissions [3].

However, China's carbon market is still in its early stage of construction, and there is still a big gap between the requirements of the "double carbon" target. The development experience of international mature carbon markets shows that carbon finance can provide liquidity for carbon markets and risk hedging tools for traders, creating conditions for managing and activating carbon assets, attracting more long-term capital participation, and playing an essential role in the sustainable and healthy development of this markets [4].

This paper analyzes the current situation and problems faced by the development of China's carbon finance market in light of the successful experience of the development of mature carbon

markets in the international arena, and proposes development paths and recommendations to enhance the financialization of the carbon market. It aims to promote the carbon market to play a greater role in achieving the goal of carbon neutrality.

2. The Basic Situation of the Development of China's Carbon Finance Market

2.1. Development History of China's Carbon Finance Market

In order to actively implement the emission reduction tasks, China has carried out a series of institution building and policy support actions. From 2011, the creation of a Chinese carbon emission trading market has expanded the scope of emission regulation to include energy-intensive industries including power, heating, iron, and steel, and conducting carbon emission trading operations on the pilot carbon trading market. In 2011, China started building a carbon market by identifying seven pilot cities for carbon emission trading, including Beijing, Shanghai, Tianjin, Chongqing, Hubei, Guangdong, and Shenzhen.

The pilot carbon market has gained significant practical experience over the course of more than ten years of investigation and has emerged as a significant method for China to reduce its carbon emissions. The Chinese government has set three specific goals for reducing greenhouse gas emissions between 2009 and 2020, intending to reach "carbon peaking" by 2030 and "carbon neutrality" by 2060. The national unified carbon emission trading market was formally started on July 16, 2021, with ceremonies taking place simultaneously in Beijing, Shanghai, and Wuhan.

2.2. Current Situation of China's Carbon Finance Market

2.2.1. Status of Carbon Trading

As of December 30, 2022, there were 230 million tons of carbon emission allowances exchanged on the national carbon market, and there had been a total of 10.475 billion yuan in transactions. The daily closing price ranged from 41-62 RMB per ton, and the average transaction price of all transactions was 45.61 RMB per ton. In general, the fundamental structure of the national carbon market has been originally formed, and the function of encouraging businesses to cut greenhouse gas emissions and quicken the transition to a green economy has initially arisen, effectively playing the carbon pricing function.

China's national carbon market adopts a "double center" model, i.e., the national carbon market's registration system is assigned to Hubei for construction and maintenance, which is equivalent to a "warehouse" for carbon assets and funds, and undertakes the registration, settlement and cancellation of carbon emission rights, allowance allocation, payment cleaning and monitoring. The carbon trading system is built in Shanghai. Shanghai is charged with the establishment and implementation of the carbon trading system, and the two places jointly assume the role of the pillar of the national carbon market [5].

Beijing Green Exchange also constructs the National Voluntary Emission Reduction Trading Center, a national platform in charge of future national certified voluntary emission reduction (CCER) trading, and encourages businesses without mandatory emission reduction obligations to take part in the project on their own initiative. With an offset ratio of no more than 5% of actual emissions, Emission control businesses engaged in national carbon markets can also use CCERs as an additional method of complying with regulations.

2.2.2. The Features of China's Carbon Finance Market Development

There are certain discrepancies in carbon prices and different local carbon market structures

depending on the level of development. In different pilots, different quota allocation, regulatory, and penalty mechanisms are used. There are certain differences in the total amount of quotas and industries covered by each regional pilot, the number of key emission units included varies, and regions with a high number of emission control enterprises included tend to be more active than those with a low number. In addition, the high carbon price may be somewhat related to the degree of development. Regions with a late start, such as Fujian, develop more slowly, so the carbon price is lower than other pilots.

2.3. Problems in the Development of China's Carbon Finance Market

2.3.1. Lack of Legal Basis

Penalties are not sufficient. Currently, Chinese companies that do not purchase enough allowances for compliance or do not report emissions as required can only be fined up to 30,000 yuan. Compared to the millions of dollars in revenue from violations, the penalties imposed on carbon market violators are too weak, leading some key emitters to choose to take the risk for the sake of profit. At the same time, this also leads to weaken their incentive to actively participate in the carbon market.

Asset attributes are not recognized. The lack of clarity of the basic legal concepts in the rules related to the carbon market has also caused some practices in administrative supervision and activities to lack a legal basis and raise questions. At present, there is no specific law in China that clearly defines the legal attributes of carbon allowances, which has led to a lack of a legal basis for the financial and tax treatment of carbon asset-related transactions and disputes over the protection of rights and interests.

2.3.2. Presence of a Compliance-driven Phenomenon

The total volume of transactions in December 2021 reached 136 million tons, 3.2 times the total volume of transactions in the first five months, accounting for 76% of the overall volume of transactions in the first compliance cycle and 70% of the overall volume of transactions in the first year, respectively. In addition, the market is clearly illiquid. The turnover rate in the first compliance cycle was only 2%, even lower than the average level of 5% in the pilot carbon market, while exchange rate in the EU carbon market was 758% in the same period. At the end of the quota clearing exercise, the trading volume of the national carbon market was significantly reduced again.

2.3.3. Long-term Planning to be Clarified

Because there isn't a longer-term emission control target and quota allocation scheme in the current national carbon market, surplus allowance holders decide to sell their surplus allowances now rather than save them for later compliance pressure. They do this out of fear that future changes in carbon market rules will make it difficult for them to meet their future compliance needs. It is challenging to steer businesses toward low-carbon investments in lack of a long-term pricing mechanism, which to some extent impedes both society's transition to a low-carbon economy and the effort of emission-controlling businesses to reduce their emissions.

2.3.4. Market Mechanisms Need to be Enhanced

The national carbon market currently only has one pricing level, which is unable to provide long-term prices for carbon emission costs or emission reduction incentives, and businesses are unable to measure the costs and benefits of low-carbon investments over the long term, failing to reflect the carbon market's resource-guiding function.

3. International Carbon Finance Market Development Experience

3.1. European Union Carbon Trading System (EUETS)

The EU officially inaugurated the EU-ETS in 2005, which is the first and largest transnational carbon emissions trading market in the world and is responsible for about 45% of EU carbon emissions. The EU-ETS, which accounts for around 45% of the EU's carbon emissions, is the first and largest transnational carbon emissions trading market in history [6, 7].

The requirement for the EU's carbon trading system to take the shape of a government-led "top-down" approach is that all EU nations must come to a comprehensive agreement on combating climate change [8]. The EU carbon trading system has undergone three stages of development since its foundation in 2005, from exploration to maturity (see Table 1). The government's leadership role has been effectively incorporated into the "top-down" architecture of the EU carbon trading market, allowing it to expand quickly and become the largest carbon trading market in the world [8].

Table 1 History of the EU carbon trading system.

Stage	Quota allocation method	Main content
Phase One: 2005-2007	Top-down quota distribution; free distribution + auction.	Participants are from 29 EU member states; covering power plants and companies with internal combustion engines over 20MW in size.
Phase Two: 2008-2012	The total number of quotas decreased slightly, and the proportion of free allocation is about 90%.	Scheduling units introduced to airlines; trading system extended to Iceland, Liechtenstein and Norway.
Phase Three: 2013-2020	Quota annual decline of 1.74%; gradually replace the free issue with an auction, the proportion of auction quotas of about 57%.	Inclusion of carbon capture and storage facilities, petrochemical production, chemical production, non-ferrous and ferrous metal smelting, etc.
Future plan: 2021-2030	Annual reduction in quota increased to 2.2%.	Setting a market stabilization mechanism to regulate the total amount of quota in circulation.

The EU's carbon emissions trading system has been gradually enhanced through research and reform over its development. Also, the system's effectiveness has considerably aided the growth of the EU carbon finance market. The EU now has a stronger voice in global climate negotiations thanks to the impressive emission reduction outcomes. Combined with the experience of the EU, China should enrich the market participants and strengthen the disciplinary mechanism for emission control companies.

3.2. U.S. Regional Greenhouse Gas Initiative (RGGI)

As the second largest carbon trading market on earth, the U.S. states and cities are also actively promoting cross-regional cooperation in emission reduction, forming a regional trading market and forming a relatively independent trading model in their continuous attempts. The state of the carbon market in each region of the United States can also offer useful references for the construction and enhancement of Chinese carbon finance market.

The RGGI is modeled after the WCI, is based on cooperation between nations that have signed commitments to cut inter-regional greenhouse gas emissions. The difference is that the RGGI

focuses on the power sector, relying on restrictions on traditional energy sources to promote clean energy [9]. Therefore, China should improve the connection mechanism with the carbon market internationally and further promote the reasonable pricing and quotas of carbon rights in the global context.

The primary distinction between RGGI and EU ETS is that RGGI is the first market-based, legally binding TEL trading agreement, with the auction allowance for carbon emission rights set at 90% at the start of its inception. Due to the selection of a development plan that prioritizes marketization, the U.S. carbon trading market has a high level of financialization at the outset of its existence. Although this growth strategy has a bigger advantage in terms of market effectiveness, it has little impact on overall carbon emissions. Therefore, China should learn from the experiences of both parties and rationalize the initial allocation of free carbon emission allowances, as well as explore increasing the financial attributes of trading products.

4. Conclusion

This paper analyzes the current development of China's carbon finance market and finds that the market is characterized by low trading and inactive transactions. In order to better realize the goal of carbon neutrality, it is necessary to draw on the experience of mature international carbon markets such as the EU and the US to promote the high-quality development of the national carbon market. This paper concludes that China can learn from the international experience to enrich the market participants, strengthen the restraint mechanism for emission control enterprises, and improve the connection mechanism with the international carbon market. This will optimize the resource allocation of the carbon market and stimulate the vitality of the carbon financial market. This paper does not analyze all the well-developed carbon markets in the world. In the future, the carbon market can be analyzed for each country's carbon market development to summarize the most effective construction suggestions.

References

- [1] Cao, Li & Liu, Yan. (2022). *International carbon trading synergy and cooperation under the UN framework - from the Kyoto Protocol to the Paris Agreement*. *China Finance* (23), 79-81.
- [2] ICAP, *Emissions Trading Worldwide Status Report 2022*, 2022 March: 8-10
- [3] Yang Shulin. (2022). (2022). *Exploring the path of financial development of carbon market under the goal of "double carbon"*. *International Finance* (10), 19-24. doi:10.16474/j.cnki.1673-8489.2022.10.005.
- [4] ICBC Hong Kong Foreign Exchange Funds Trading Centre Research Team & Xu Rong. (2022). *A comparative study on international carbon finance market and related thoughts*. *Journal of Modern Finance* (12), 39-45.
- [5] Binghui. (2021). *Shanghai accelerates the construction of international carbon financial center*. *China Finance* (18), 58-59.
- [6] ESMA, *Emission Allowance and Associated Derivatives Final Report*, 2022 March 28: 76-82.
- [7] Wang, Huiqing. (2021). *International Experience, Development and Prospects of Carbon Market Construction in China*. *International Finance* (12), 23-33. doi:10.16474/j.cnki.1673-8489.2021.12.004.
- [8] Li, Jingyuan. (2022). *Practical experience and inspiration of carbon finance market in Europe and America*. *Cooperative Economics and Technology* (02), 64-66. doi:10.13665/j.cnki.hzjjykj.2022.02.025.
- [9] Thomas Eichner & Rüdiger Pethig. (2014). *International carbon emissions trading and strategic incentives to subsidize green energy*. *Resource and Energy Economics* (2). doi:10.1016/j.reseneeco.2013.06.001.
- [10] Cai, Ning. (2022). *Drawing on international experience to strengthen carbon market construction*. *China Finance* (04), 63-64