

Research on the Improvement Idea of the Carbon Tariff System

Wenhao Yang*

School of Law, Guangxi University, Nanning, Guangxi, China
*Corresponding author: Diegoyoung0213@163.com

Abstract: As the problem of the greenhouse effect becomes more serious, limiting carbon emissions has become an issue in environmental issues. The author agrees that the existing EU carbon tariff policy has a positive incentive to limit carbon emissions. However, for the global carbon emission problem, a joint boycott mechanism should also be established in order to truly make the carbon emission governance of the international community achieve Pareto optimality, that is, to achieve the optimal allocation of resources on the carbon emission issue. But the boycott mechanism is only an answer drawn from the overall efficiency of the international community, and it does not answer the question of the legitimacy of international economic law and the achievement of fair distribution. Therefore, the author interprets carbon tariffs in terms of international law and supports that the purpose of carbon tariffs is to maintain public morality and can become an exception to the principle of most-favored-nation treatment. The author also envisages several preconditions for establishing carbon tariffs to achieve the goal of fairness and to exclude individual countries from using carbon tariffs to restrict international trade in disguise.

Keywords: the carbon tariff system; the game theory; the international environmental law

1. Introduction

Climate change is a natural phenomenon, but most scientists now agree that human actions exacerbate this natural process. More specifically, carbon dioxide emissions from human activity are rapidly accelerating the "greenhouse effect," the trapping of infrared radiation (heat energy) in Earth's atmosphere by greenhouse gases, causing the planet's surface to warm. Atmospheric carbon dioxide concentrations have risen by more than 30 percent since the industrial age, and scientists predict that if emissions continue to grow at the same rate, the greenhouse gas will be twice as high as pre-industrial levels by the middle of the 21st century. Many experts insist that this would have catastrophic consequences and that there is an urgent need to reduce carbon emissions. Therefore, the European Union and some other countries have begun to use carbon tariffs to limit carbon emissions. This article analyzes the carbon tax system from the two aspects of efficiency and fairness by analyzing the carbon emission system and its system principles to propose a carbon tax mechanism applicable to all countries.

2. Formation Process and Issue of Carbon Tariff

2.1. The formation process of carbon tariff

The European Union has established a series of measures on carbon tariffs to reduce the impact of carbon emissions. Previously, the EU adopted an emissions trading scheme. The plan to limit carbon emissions stems from the Kyoto Protocol's mandate to reduce carbon emissions in industrialized nations. An emissions trading scheme is a government scheme that sets out authorized emissions and allocates permits accordingly, allowing the market to determine the price of carbon emissions. The EU ETS started on January 1, 2005, with a mandatory "warm-up" phase from 2005 to 2007, and a second mandatory phase from 2008 to 2012, which coincides with the first commitment period of the "Kyoto Protocol" correspond.

As of 2009, the EU ETS covers more than 10,000 energy and industrial devices, effectively reducing carbon emissions. However, this method is mainly limited by national sovereignty, and it is difficult to carry out in non-EU countries. As a result, only enterprises in EU countries are restricted by carbon emissions, which has a huge impact on the international competitiveness of their enterprises. And only the EU adopts a strict carbon emission policy, which cannot solve the externality problem of "carbon

leakage".

In order to solve the above problems, the EU decided to introduce carbon tariffs (CBAM). CBAM is a specific carbon tariff imposed by the EU on carbon-intensive imported products. It requires the competent authority of the importer's country to declare the carbon emissions of imported products and purchase corresponding carbon emission certificates to pay the carbon tariff. In December 2019, in the "European Green Deal" issued by the European Commission, it was proposed for the first time to introduce CBAM to reduce the risk of carbon leakage. At present, the CBAM bill has passed the "first reading" in the European Parliament. The European Commission, the Council of the European Union, and the European Parliament are conducting tripartite talks on the CBAM Act. After reaching an interim agreement, it will be submitted to the Council of the European Union and the European Conference for approval. It is expected that the legislative process for CBAM will be completed by the end of this year.[1]

2.2. The issue of the carbon tariff

The author believes that the way of carbon tariffs is indeed helpful to solve the current problems encountered by the EU in terms of carbon emissions. But it is obviously not efficient to carry out carbon emissions only for EU countries. Because other countries consider the EU's carbon tariff restrictions, they may consider reducing cooperation with it. From a long-term perspective, such an approach will not only lead to a reduction in the EU's international competitiveness, but this negative feedback will also make the EU eventually have to give up collecting carbon emissions. The author thinks this is a prisoner's dilemma. Only EU countries adopting carbon tariffs will eventually lead to inefficient operation of relevant conventions to prevent carbon emissions, and ultimately cannot achieve effective control of carbon emissions. At the same time, the carbon tariff system is also unfair due to the actual situation of each country. In the following, the author will analyze two aspects of efficiency and fairness to find ways to improve.

3. The Principle Analysis and Improvement Conception at Efficiency

3.1. Principle analysis of carbon tariff

From an economic point of view, climate change caused by carbon emissions is a "negative externality". Negative externalities refer to the costs of economic activity rather than being internalized into the economic activity itself. Negative externalities are thus costs imposed on third parties in the absence of market correction. As such, they are often viewed as phenomena that must be corrected by policymakers. Climate change is a global negative externality because it involves the "global environmental commons". The unregulated exploitation of the global environment by individual countries may create a "tragedy of the commons," where each country has the incentive to exploit resources in the short term without investing in long-term conservation. The author thinks that according to the EU, only limiting the EU's total carbon emissions will create a kind of prisoner's dilemma. An explanation of this phenomenon will be given below:

EU countries and non-EU countries are in an environment in which both can choose to limit carbon emissions and increase the use of environmentally friendly energy, or they can choose not to limit carbon emissions. With regard to EU countries and non-EU countries, a certain strategic space can be formed.

The author expresses the restricted and unrestricted costs in C, from which the following Table 1: Standard prisoner dilemma payoff matrix can be drawn:

Table 1: Standard prisoner dilemma payoff matrix

	non-EU countries		
	limit carbon emissions(cooperate)	not to limit carbon emissions(defect)	
EU countries	limit carbon emissions (cooperate)	C1,C2	C3,0
	not to limit carbon emissions (defect)	0,C4	C5,C6

As listed in Table 1 above, there are three possible scenarios for policies related to carbon emissions. In the first scenario, non-EU organizations can choose to cooperate with the EU to limit carbon emissions. At this time, due to the joint governance of the EU and non-EU, the problem of negative externalities

can be well resolved. Its cost is the lower level of C1 and C2, and with the improvement of the environment, the cost of C1 and C2 will gradually decrease. In the second scenario, EU countries choose to limit carbon emissions, and non-EU countries choose not to limit carbon emissions (the situation is reversed for EU countries and non-EU countries). At this time, the cost of the country that restricts carbon emissions is C4 or C3, because the country that restricts carbon emissions may suffer from the negative externalities of countries that do not restrict carbon emissions, and its enterprises are directly affected by the restrictions on carbon emissions. The decline in international competitiveness, so C3 and C4 are significantly greater than C1 and C2. The cost of countries that do not limit carbon emissions is 0, or because the negative externalities of their production activities are borne by countries that limit carbon emissions, and the enterprises in countries that limit carbon emissions are restricted, which leads to the cost of countries that do not limit carbon emissions. The enhanced competitiveness of enterprises constitute a "free rider" phenomenon, and its cost may be negative. The third scenario is that neither EU countries nor non-EU countries have restrictions on carbon emissions. At this time, the cost will be affected by mutual negative externalities. The cost at this time is C5 and C6. If the environment has not been improved, the production efficiency will gradually decrease. Therefore, in the long run, the cost of C5 and C6 will be greater than the cost of C1 and C2, but the cost of C5 and C6 will always be less than that of C3 and C4, because C3 and C4 not only need to limit the development of enterprises in their own countries, but also undertake the production of other countries negative externality problem. Therefore, $C1, C2 < C5, C6 < C3, C4$. In reality, the choice of each participant is uncertain, so it is necessary to introduce the concept of a mixed strategy, that is, add random probability to analyze the possible strategies of each department. At this time, it is assumed that the probability of restriction by non-EU countries is P, and the probability of no restriction is (1-P). The expected cost of the restriction in the EU countries is: $P \times C1 + (1-P) \times C3$ and the expected cost of the non-restriction in the EU countries is: $P \times 0 + (1-P) \times C5$. Obviously, when C3 and C5 are close or even if C3 is greater than C5, regardless of the probability P of non-EU countries choosing to restrict, the expected cost of EU country restrictions is greater than the expected cost of EU countries not restricting. Therefore, based on the reason of individual rationality, which is to minimize costs, the dominant strategy of EU countries at this time is not to restrict, and the same strategy is also applicable to non-EU countries. However, such a strategic arrangement will eventually lead to the phenomenon of no limitation, and no limitation of carbon emissions is irreversible damage to the environment. At this time, as time goes by, C5 and C6 will increase accordingly, which is the overall cost. The highest one, is the "tragedy of the commons". Therefore, when the optimal strategy of an individual as a country will lead to a relatively high overall cost, it will lead to a conflict between individual rationality and collective rationality, and the Prisoner's Dilemma is formed at this time.

Solving the Prisoner's Dilemma requires mechanisms for punishing noncooperative behavior (or providing incentives for cooperative behavior). One way of punishment is "You are not benevolent, I am not righteous", "Repay kindness with kindness", and "Return grievances with grievances". The game theory proves that if the cooperative relationship is fixed and this relationship may be repeated, each person can choose the corresponding countermeasures according to the other party's previous actions, such as punishing the other party with "non-cooperation" for "non-cooperation", and "cooperating" with "cooperation". "Reward each other's "cooperation", and mutual cooperation may appear as a Nash equilibrium.[2] This is the reputation mechanism under repeated games. Here, the punishment for non-cooperative behavior is enforced by the injured party, so it is called "second-party enforcement". The carbon tariff that EU countries are implementing is a kind of "second-party enforcement". Such an approach by EU countries can indeed incentivize countries that trade with it to implement measures to limit carbon emissions, regardless of the implementation rules of international law.

3.2. Improvement of the effect level of carbon tariff

The author believes that the "second-party implementation" of EU countries setting carbon tariffs can encourage other countries to join in the governance of carbon emissions, making the cost-benefit of the international community related to the EU the lowest in carbon emissions governance. However, only the implementation of carbon tariffs in EU countries cannot make all countries in the world form an incentive mechanism for limiting carbon emissions. Because through globalization, the relationship between countries is getting closer and closer. However, only the EU to formulate carbon tariffs cannot allow countries with less economic ties with the EU or countries that pay fewer carbon tariffs through EU countries to limit carbon emissions. Therefore, only a unified "third-party enforcement" method can finally effectively control carbon emissions globally. In this regard, the EU is also pushing hard to bring CBAM into the WTO system. The author thinks that a "boycott" approach can be used to formulate an international agreement on carbon tariffs. The so-called "boycott" means that every player in the game should not only cooperate but also have the responsibility to punish others for not cooperating.[2] Putting

it in the international context of carbon emissions, first, each country sets carbon emission standards based on national production conditions, and they should be below the established carbon emissions. Second, if a country exceeds the standard, all countries should charge carbon tariffs on the country's carbon-emitting products in a step-by-step manner until the cumulative carbon emission standard is reached in the next cycle. Third, carbon tariffs must be charged to carbon-emitting products from countries whose carbon standards exceed the standard. If a country does not charge carbon tariffs, the country also needs to be responsible for the carbon emissions generated by imported products. This norm is different from the previous "second-party enforcement" standard in that the "boycott" will not only punish countries that do not cooperate with carbon emissions but also punish countries that do not punish.

After World War II, the boycott was an incentive mechanism to maintain long-term international peace, especially a way to protect the territorial integrity and sovereign integrity of various countries. The author believes that it is reasonable and efficient to apply the boycott mechanism to limit carbon emissions. Because, first, protecting the environment and controlling carbon emissions is a major event for the long-term survival of human beings, and the purpose is justified. Second, people all over the world have the right to enjoy a good environment. Limiting carbon emissions is also the protection of human rights. Third, the boycott mechanism, as mentioned above, can reduce the cost of the international community on carbon emissions as a whole, and can achieve Pareto optimality. Last but not least, Mahoni and Saziliko show that if everyone is patient enough and transparent enough about individual behavior, this punishment rule can guarantee cooperation, that no one will choose not to cooperate in the first place, that everyone is motivated to punish violators, and that everyone is willing to accept punishment.[3] The writer thinks the boycott mechanism can make the entire international community effectively limit carbon emissions.

This boycott mechanism is only discussed from the point of view of the overall interests of the international community, which can only allow the international community to achieve the lowest overall cost in carbon emission governance and thus achieve Pareto optimality. However, the design of this system does not discuss the issue of distributive justice. For example, developed countries have historically completed industrial upgrading by means of polluting the environment, and have good technology to control carbon emissions at a relatively low cost, but most developing countries are still in the process of industrial upgrading and have not yet matured. Technology to control carbon emissions. If a unified calculation standard is used to allow all countries to apply the mechanism of carbon tariffs in a short period of time, it will severely hit the economies of developing countries and cause a kind of exploitation of developing countries by developed countries. Therefore, the author will bring the issue of carbon tariffs into the framework of the existing international economic law, discuss its legitimacy from the perspective of distributional fairness in the next section, and propose ways to improve it.

4. Insufficiency and Improvement of Boycott Mechanism in Fairness

4.1. Insufficiency of the boycott mechanism at the level of fairness

The first paragraph of Article 1 of the General Agreement on Tariffs and Trade is the most basic and fundamental provision of the most preferential national treatment: in terms of import and export, related imports and exports, and international payment transfers, the methods, import and export regulations and procedures for imposing the above-mentioned tariffs and fees, as well as the matters mentioned in Article 3, paragraph 2 (domestic taxes) and paragraph 4 (domestic regulatory treatment) of this Agreement, members shall not be entitled to receive rewards for granting such products, Similar products originating from or destined for all other member territories should be granted immediately and unconditionally. In short, the preferences granted by a member to products produced in or shipped to any other country or region (not limited to WTO members) shall be immediately and unconditionally granted to similar products produced in or shipped to all other WTO members.[4] Due to the technology gap among exporters, the implementation of the above-mentioned boycott mechanism will inevitably be evaluated differently according to the degree of environmental regulations in each country, the level of technology, the availability of ETS, and other matters.[5] Therefore, even if a carbon border tax is levied according to a consistent standard, discrimination will still exist in reality, which will result in a situation of unfair distribution in form. However, from a substantive analysis, if the first paragraph of Article 1 of the General Agreement on Tariffs and Trade is strictly followed, all member states cannot discriminate in the tariffs of similar products. Then the negative externalities caused by countries that do not limit carbon emissions need to be borne by countries that limit carbon emissions, which is also a substantial unfairness.[6]

The boycott can be realized by citing the first paragraph of Article 20 of the General Agreement on Tariffs and Trade. In order to maintain public morals, the collection of carbon tariffs should be interpreted as an exception to the first paragraph of Article 1. As analyzed above, if carbon emissions are not controlled, it will lead to a "tragedy of the commons". This is a huge risk for all of humanity. Therefore, the collection of carbon tariffs is fully in line with the necessary measures to maintain public morals. However, as mentioned in Article 20, for countries with the same situation, the measures implemented shall not constitute arbitrary or unreasonable differential treatment or constitute disguised restrictions on international trade. The same situation here cannot be explained by a unified carbon emission standard. This is because the economic conditions of each country and the proportion of industries that produce carbon emissions are different. If the carbon emission standards of different countries are uniformly stipulated, it will constitute unreasonable differential treatment and constitute a disguised restriction on international trade. Therefore, the application of the boycott mechanism needs more fairness considerations.

4.2. Improvement in fairness

Although all countries have established carbon tariffs to help improve the environment, it is necessary to maintain public morals. The following preconditions need to be met in order for carbon tariffs to truly achieve the measures necessary to maintain fairness and public morals, and not be used as a disguised restriction on international trade. First, the technological gap in carbon emissions between developed and developing countries is one of the reasons for the unfair distribution of carbon tariffs, so developed countries should use relatively low prices and unlimited tariffs for the purpose of maintaining public morals. Share carbon emission reduction technologies with developing countries until the efficiency of carbon emission limitation in developing countries reaches the level of developed countries. Second, the proportion of carbon-emitting industries in developed countries and developing countries is not equal in the domestic industry. This problem can be solved from two aspects. First, the carbon-emitting industries of each country can be estimated, and then different formulas are formulated. National carbon emission governance needs to account for the proportion of carbon emission industry profits. This ratio should be low in developing countries initially because this ratio has a greater impact on countries with a larger share of carbon emissions. At the same time, developed countries should share relatively low prices and unrestricted technologies related to the use of sustainable resources in developing countries. According to the proportion of shrinking carbon-emitting industries, it can be increased year by year. Third, establish a third-party assessment agency to assess the carbon emission governance standards of developing and developed countries. Its members should not only be composed of developed countries and developing countries but also should meet the principle of fairness and represent the interests of all parties. The author thinks this premise can not only help to achieve the necessary purpose of maintaining fairness and public morality but also prevent individual countries from using carbon tariffs as a disguised means of restricting international trade.

5. Conclusion

Only by meeting the preconditions of carbon tariffs above can the realization of carbon tariffs meet the conditions of distribution fairness, and only by forming a global boycott mechanism can the entire carbon emission measure reach Pareto optimality, that is, to set up an Apply a carbon emission system that balances efficiency and fairness with all countries.

References

- [1] Lim B, Hong K, Yoon J, et al. *Pitfalls of the EU's Carbon Border Adjustment Mechanism [J]. Energies*, 2021, 14(21):1.
- [2] Weiyang Zhang. *Game and Society[M]. Peking University Press*, 2012.
- [3] Mahoney, Paul G, and Chris William Sanchirico. *Norms. Repeated Games and the Role of Law. [J]. California Law Review*, 2003 Vol. 01: 1281-1329.
- [4] *International Economic Law writing group. International Economic Law [M]. Higher Education Press*, 2018.
- [5] Han J. H. *Competition and Coexistence of International Trade Norms and Environmental Norms: Focusing on the EU Carbon Border Adjustment Mechanism. [J]. Rev. Int. Area Stud.* 2021(30): 156–162.
- [6] Li Qinxuan. *Analysis of carbon tariff system and China's response [J]. Charming China*, 2011 (5): 1.