

The economic impacts of the carbon tariffs

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Abstract. Considering the deteriorating environmental problems, the carbon tariffs are planned to implement on the high carbon products. This passage provides the analysis of the influence of the carbon tariffs, especially to the developing countries. Admittedly, the carbon tariffs can, to a certain extent, reduce the greenhouse gases emissions. However, there is no doubt that they pose threats to the economic entities, globalization, domestic employment, and the international market. Meanwhile, both domestic and international measures of the developing countries are predicted. In terms of the domestic measures, the government should encourage the innovation in the field of green technologies and motivate the establishment of trading mechanisms. As for the international measures, the countries should cooperate on dealing the international issues and maintain the fairness of the international market.

Keywords: protectionism, carbon tariff, carbon emission trading, carbon pricing.

1. Introduction

As more and more countries, especially developing countries, are aware of the seriousness of environmental protection. The carbon tariffs, a tax on carbon-intensive imports, have been adopted and triggered heated discussion. Veel [1] has investigated in the journal of International economic law the political and legal constraints of the carbon tariffs. Tang, Zhang and Yu [2] used the CGE model to research the influence of carbon tariffs on the trading structure, industries, energy, and carbon emissions. Considering the current situation of the emission of carbon dioxide, the regional situations, the carbon tariffs have been taken into consideration in the international platform.

Advocates claim that the countries with high carbon emission reduce the emissions of the greenhouse gases through facing increasing the price of their costs, since the tax tariffs will be exposed to the high consumption products in the field of the cement, steel, oil refining, papier and so on. Up to now, the United Nations have already put forward the concrete policy objective and policy options of the carbon tariffs. The practice of the UN will be imitated by other developed countries, which will influence the system of the global trade situation. A numerical model was used to claim that the carbon tariffs are a feasible, effective threat to reduce the costs of global carbon emissions [3]. Chen and Guo [4] suggested through the GTAP 8.0 model that the carbon tariffs have a positive effect on the industrial department in China. However, the opponents of the carbon tariffs claimed that the carbon tariffs pose threat to the globalization, the economic balance, and to the development of the developing countries. As a developing country, in order to decrease the influences brought by the carbon tariffs, they should take actions from the international and domestic level. Böhringer, Müller, and Schneider [5] considered that the carbon tariffs increase the disadvantages of costs in the international market, although the tariffs create a relatively fair environment on the domestic market.

In order to analysis the influence of carbon tariffs on the developing countries, this passage firstly analyze the background of the carbon tariffs. With the increasing attention on the environment problems, countries have taken several measures to decrease the greenhouse gas emissions. One of the measures is the carbon tariffs which increase the costs of the products and arise the reform of producing mechanisms of the companies. Besides, the reasons of the adaptation of the carbon tariffs are quite complex. Mainly, it is because the goal of urging the carbon leakage between two countries and increasing economic development in the developing countries. After the carbon tariffs are applied, their influences are predictable. On one hand, it has a positive effect on the reducing carbon emissions and promoting the companies which produce high carbon products to change the productive structure. On the other hand, the carbon tariffs pose threat to the development of the developing countries in

terms of their carbon-dependent economy. Additionally, there are solutions to decrease the threat of the tariffs on the developing countries. As for domestic measures, the government can pay more attention on the green industries and encourage the creation of the low carbon technologies. Meanwhile, a wholesome carbon trading mechanism should be established. As for the international measure, the developing countries should actively take part in the discussions of the establishment of carbon tariffs and through the diplomacy the unfair relationship can be relieved.

The structure of the passage can be divided into four parts. Section one introduces the factors of the implementation of the carbon tariffs, including the serious environmental problems, the problems of carbon leakage between countries and the fear of development of the developing economic entities. Section two analyzes the positive and negative influences of the carbon tariffs. Section three provides the solutions to the developing countries in combating the influence brought by the carbon tariffs. Section four concludes the passage and provide the further research direction.

2. The environmental problems

2.1 From the perspective of the global economy

Since the 1970s, there is a positive correlation between the global carbon emissions and the global economic development. Since the burning of more and more fossil fuels resulted in the increase of carbon dioxide and fossil fuels as the main energy are an essential productive factor, they provide constant power to the economic growth. VECM test confirms that the fossil fuels influence from the economic development to the carbon emission [6]. The results of the ARDL model of long term and short term suggests that the consumption of fossil fuels has a positive relationship with the carbon emission, because the relationship is U-shape [7].

During the economic recession, the carbon emission declined as the energy consumption declined. For example, during the economic crisis in 2008 and the COVID-19 in 2020, according to the data from the International Energy Agency IEA) [8], a gradual decline of carbon emission happened. In 2018, the total amount of the carbon emission has reached 340,5 billion which is three times more than that in 1965.

Moreover, the environmental pollution has influenced the economic growth. In the short term, strengthening environmental protection poses great pressure on the economic development. There is no doubt that the China's economy has explosively risen in the end of 20th century and in the beginning of 21st century. Und now they should pay price for their scant regard for their environmental awareness [9]. According to the dynamic spatial panel models, the relationship between industrial structure and the technical development to the carbon intensity has been investigated und the correlation diversifies in different countries. For example, in China, the technical development is more important than the upgrading of an industrial structure [10].

The carbon tariffs are a tax on carbon-intensive imports (based on either the importing or the exporting country's carbon intensities). The Carbon Border Adjustment Mechanism (CBAM) covers the five fields: electric power, steel, cement, aluminum, and chemical fertilizer. The importers from the European Union need to buy the "Carbon Certificate" for importing merchandise [11]. The "Financial Times" has pointed out that this mechanism will start up in 2030 and provide annually 9 billion Euros which will support the recovery fund for the EU member states in rehabilitating the economy after the pandemic [12].

2.2 From the perspective of the regional economy

In Asia, especially in China, Japan, the carbon emission has increased greatly due to the growth of economy. The tendency resulted in gradually becoming the largest region in the world that produces carbon emission and the carbon emissions in Asian has exceeded 50% of the global total, because these countries highly rely on the traditional resource. According to the data from NetZero Tracker [13], the goal of net zero emission has covered nearly 88% of the greenhouse emissions, 90% of economic value and 85% of the population. Asia's largest economy—China—has set the target, that

they become carbon neutral, in 2050. China states to be “common but differentiated responsibility” in response to the implementation of carbon tariffs [14]. Considering the influence brought by the carbon tariffs, the export of domestic goods would be curbed, while the tariffs benefit limitedly to the environment based on the “economy-energy-environment (3E) CGE model” [15]. Thus, China has instead taken actions to protect the environment, including establishing the system of the carbon trading. 8 regional carbon emission markets have been founded since 2013. In order to reduce the carbon consumption, the electricity industry has been considered [16]. Additionally, according to the DID model, the influence of carbon emissions to the energy conservation has been investigated. The result shows that the region with Emissions trading system (ETS) reduce the energy consumption by 28%, while carbon dioxide by 15.5% [17]. These effects resulted from improving technical efficiency and adjusting the industrial structure.

Japan, as a developed country in Asia, has already completed industrialization process. The Japanese Prime Minister has in October 2020 declared that Japan is committed to being carbon neutral by 2050. As a highly industrialized state, Japan depends on importing energy because of lacking resources. Therefore, they concentrate on improving the energy utilization rate and actively adjusting the macroeconomic policy, aiming at development of low carbon technology [18]. However, according to the result of Dagum Gini decomposition, the carbon emission of different Japanese regions differed greatly: the low-carbon development level of some parts has been in the lead, while some parts fall behind because of the imbalance of different regions [19].

India, as the third largest energy consumer, rely on the importing of fossil energy and the proportion has been increasing annually. The model of its energy consumption is “high growth”, “high emission” and “high dependence”. There are many factors that result in its high consumption: the urbanization, technical development, the economic growth, and energy price. In order get rid of the “three high” consumption model, the government should propel the reform of energy price on the premise of its national condition. The energy structure should be optimized, and the market vitality would be stimulated by the market means [20].

2.3 Reasons

Facing the increasing environmental problems, the EU has proposed the carbon tariffs in order to relieve the serious situation. Once the carbon tariffs are implemented to the firms and consumers, the emissions leakage will be curtailed. The emission leakage is imbalance of carbon emissions between countries which resulted in the transition of the investment and production of the carbon intensive enterprises from countries with high emissions regulations to the low emissions regulations. On one hand, the problems of emissions leakage influence the measurement of the emissions reduction responsibility. In the international climate negotiation, it is the focus in the negotiation how to allocate the rights and obligation of the carbon emissions. However, if the carbon leakage exists, the calculation of the carbon emissions between countries would be influenced, which results in the equity issues of the emissions responsibility [21-23]. The emissions leakage leads to the increase of the carbon emissions in developing countries. Therefore, during the process of establishing the new order of international climate, the accuracy and rationality of calculation of the emissions requires the abundant concern.

The increasing development of the developing countries poses threat to the interests of the developed countries [24]. Therefore, the developed countries have checks and balances in place to ensure their leadership and the power of discourse. Once the “carbon tariffs” has been seen as “political correctness”, all countries determine their own standpoint: either for or against the issue. The consequences are: the advocates take on moral high ground, while the opponent become the target for a lot of criticism. Their international images will be damaged, and they will face possible sanctions [25].

3. The influences of the carbon tariffs

3.1 The carbon tariffs contribute to the decrease of the greenhouses gases emission and promoting the structure upgrading of the industries

The carbon tariffs increase the tariffs of “three high” products. Objectively, it reduces the emission of greenhouse gases and improves the environmental quality. In terms of demands, the demands of the products will decrease due to the increasing price of these products, which indirectly reduce the production because its high costs and reduction of the international competition. Therefore, the companies will reduce the production of the “three high” products when the increase in costs and reduction of profit are considered. Using the two-country model, the effect of the carbon tariffs on the manufacturing plant greenhouse gas emissions has been studied [26]. Theoretically, a big enough country can use the carbon tariffs to reduce the foreign production of the polluting goods. Meanwhile, through the CGE model, the global trade and energy use have been investigated [27]. The study shows that the carbon tariffs can effectively reduce the carbon leakage, while the reduction of the global cost of emission needs further investigations.

The carbon tariffs encourage the increasing demands of the clean energy and trigger the technical innovation [28]. To a certain extent, the carbon tariffs impose the companies to engage more energy in adjusting the structure, increasing the techniques of export products, and decreasing the energy consumption. To decrease the shock of carbon tariffs and maintain competitiveness, the companies, especially the transnational corporations, have the ability to invest and introduce the new technology with the purpose of enhancing the energy efficiency and reducing the greenhouse gas emissions. Therefore, the carbon tariffs are able to encourage the companies to focus on saving energy and upgrading their system. In the long run, the carbon tariffs will change the energy structure and the ways of emissions.

3.2 The carbon tariffs damage the economic development of the developing countries

3.2.1 The carbon tariffs pose threat to the globalization

Due to the problem of carbon leakage, the carbon tariffs are a multilateral problem [29]. It will be still a long time before the carbon tariffs has finally been implemented. At present, the methods, such as removing the energy subsidies, are used to increase the energy efficiency. However, these methods mean that the energy cost of the developing countries will be increased and then the product competitiveness will be influenced. Moreover, the developing countries lack international right of power. Being restricted by the economy and techniques, the export products of the developing countries generally cannot reach the low carbon emission standards. Therefore, they become the targets of the carbon tariffs. Moreover, the standpoints on the carbon emission reduction of different developing countries don't coordinate with each other. While some countries aren't sensitive to the carbon tariffs due to the relatively small economical quantities, some coastal countries fear the global warming. Thus, the confrontations between new-emerging countries and small developing countries weaken the ability of carbon tariffs negotiation.

3.2.2 The carbon tariffs exacerbated the global economic imbalances.

The developed countries have the first-mover advantages of the techniques in the field of green and low-carbon techniques. On the contrary, the carbon tariffs pose a buffer period to the developing countries which continuously transform their green and low-carbon industries through one-sided levy and reduction in the profit of the industrial development [30].

From two aspects-time dimension and spatial dimension-can the carbon tariffs be supposed to be unfair. On one side, in the process of the industrialization of the developed countries, the carbon tariffs and carbon trading system didn't exist. The massive carbon emission resulted in the nowadays global warming. Once the carbon tariffs are adopted to the developing countries, they will have to pay the price of the carbon emission. On the other hand, the energy consumption of the developing countries is higher due to the technology and management. Additionally, the developed countries relocate the

high-consumption industries to the developing countries and import these high-consumption products in a relatively low cost. The carbon tariffs can be seemed as a form of segmentation of the economy surplus, which intensify the imbalance of the benefit between the developed countries and developing countries in the field of economy and trade. Meanwhile, it will be averse to the new establishment of the new global economic governance.

3.2.3 The carbon tariffs increase the domestic employment pressure

Imposed the carbon tariffs, the exports in the field of manufacturing industries will decline, which influence the domestic employment situation. Since the developing countries mainly exports the products in the field of the manufacture, which are primarily high carbon consumption product within the scope of the carbon tax, the exports of certain industries will be influenced. The everlasting advantage-low-cost would disappear, and the domestic products would be at a disadvantage. If these companies don't in the short term transform and upgrade their production structure, they will struggle to survive in the market. In the long run, the difficulties in the employment in these fields will intensify [31].

3.2.4 The tariffs impact the exploration of the enterprises in the developing countries the international market.

When the United Nations adopt the carbon tariffs policy, the global low-carbon demands will form. From then on, the companies around the world regard the low-carbon management as a kind of society responsibility and reduce to purchase products made by high carbon. At the meantime, the people gradually accept the concept of low carbon manufacturing and green development. Once the products are labeled "pollution" and "non-environmental protection" by EU, the Chinese product will be affected, resulting in the boycott of the purchase and consumption of certain enterprises, and hindering to expand the international market.

4. The solutions of carbon tariffs

4.1 The international solution to the carbon tariffs

When the countries join to make the regulation to the carbon tariffs, they can safeguard their own interest. In terms of the carbon tariffs, a multilateral communication mechanism is more effective and vital than the carbon tariffs itself to the climate governance. Since there isn't a so-called international environment organization that promotes the international cooperation and aims at solving the problems of economy, society, culture and human welfare, the authoritative United Nation undoubtedly a platform for the negotiation between developing countries and developed countries. Under these circumstances, the developing countries maintain the principle of "common but differentiated responsibility" based on the real situations. Moreover, they actively take part in the strengthening the international cooperation. While the countries actively participate in the negotiation with the developed countries, they should assert their own interests [32-33]. For example, China, as the largest trade partner in the UN, should cooperate with UN, America, and other developed economies to negotiate a criterion of the tariffs, the appropriate mechanism, and the level of transparency, aiming at an optimal tax to China itself and to other developing countries.

With respect to the developing countries, they should strengthen the cooperation with other developing countries and provide a more preferential treatment to the countries which have relatively vulnerable environment and under-developed economy. For example, relief from the obligation of the reduction of carbon emission or offering emergent funds, techniques, human resources to the development in order to intensify the adaptability to the transformation of the natural environment [34].

4.2 The domestic solution to the carbon tariffs

4.2.1 Encourage innovation and develop green, low-carbon industries

The high-carbon emission industries should devote their capital and attention on the transformation from high emission to relatively low emission, in order to enhance their competition in the market. The manufacturing enterprises should overcome the techniques of the energy conservation and explore the utility of the wind power, hydro energy, and hydrogen energy. Besides, the production technology and the production efficiency can increase, which reduce the usage rate of the unit product to the resources. Fundamentally, this measure reduces the production of carbon. In the long run, the “carbon neutral” or reduction of carbon emission form inside the company, which benefit not only the companies themselves but also the global environment.

The government can control the market by adopting a relatively low tariffs to certain environmental-friendly industries and use their own advantage to develop new energy industry and environmental industry, enhancing the energy usage. Meanwhile, when establishing a nationwide taxing system, the influence of the tariffs to the market mechanism and energy saving should be considered. On the basis of minimal lose of social welfare, the international competitiveness can be increased, promoting the transition of low carbon in the society [35].

4.2.2 Improve the trading mechanism in the carbon market

A scientific and transparent accounting system of the carbon emission should be carried out. Moreover, the carbon futures can be developed, and the energy conservation and pollution reduction can be promoted by the price adjustment mechanism of the market. Additionally, the legal system and the supervisory platform should be established. It is the legal support in the field of energy, environment, tax and carbon finance that promotes the operations of the carbon trading mechanism. An independent supervisory platform controls the carbon market, completes the allocation of the quotas and the punishment of the excessive emission. Besides, the government authority established the mechanism that censor the carbon-emissions company to submit the regular report and enhance the professional training in the operating skills of the inspectors [36]. In order to enhance the trading efficiency, both parties can trade on the secondary carbon trading market after they determine the price.

5. Conclusions

The passage conducts an analysis of the background, influences, and solutions to the carbon tariffs. According to the statistics of the carbon emissions, the seriousness of the environmental problems arouses the attention from the countries and institutions. Therefore, the carbon tariffs have been carried out to expose on the high carbon products. In addition, the aims of the carbon tariffs include solving the carbon leakage between the countries and reduce the fear of rapid development of the developing economic entities. Once the carbon tariffs are applied on the high carbon products, the positive and negative influences will appear. In terms of the positive influences, the carbon tariffs result in the decreasing of the greenhouse gases emissions and encourage the companies to promote the upgrading of the industrial structure. Moreover, it triggers the technical innovations of the investigations in the clean energy. In terms of the negative influences, the carbon tariffs pose threat to the globalization, preventing the developing countries to increase their competitiveness on the international markets. The pressure of the employment rate in the field of manufacturing industries will be worried due to the tendency of saving the costs of the products. Because the tariffs increase undoubtedly the costs of the products and the developing countries lack mature technology, the advantages of these companies will reduce. In order to combat the threats of the carbon tariffs, the international and domestic solutions of the developing countries are provided. As for the international solutions, the countries can participate in the international discussions to formulate the regulations of the carbon tariffs and negotiate with other countries in the principal of “common but differentiated responsibilities”. The method of diplomacy can solve the climate problems which triggers the collaboration between countries on dealing the environment problems. As for the domestic solutions, the government should use the

market to stimulate the innovation of the companies in developing green and clean energy and devote the investment on the transition from high emission to low emissions. Besides, the government, as well as the authorities, should establish a mature trading mechanism in the carbon market to ensure the transparency, fairness of the carbon trading.

At present, the carbon tariffs haven't been implemented. Therefore, this passage is based on the models, such as CGE model, the DID model, and predictions of the scholars and institutions. Once the carbon tariffs are implemented, the details and the tendency of the carbon tariffs will probably be adjusted, and the influence will change. On the process of formulating the carbon tariffs, there are many possibilities. When increasing countries participate in the process, the interests of the countries will be considered. Thus, the future studies will depend on the latest version of the regulations of the carbon tariffs.

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