International Experience and Inspiration on China's Introduction of Carbon Tax under the Carbon Peaking and Carbon Neutrality Goals

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Abstract. In the face of the Carbon Peaking and Carbon Neutrality Goals, carbon tax, as a key institutional tool, is crucial for improving green tax system, addressing climate change and international trade challenges. Although it has significant advantages, the implementation of carbon tax also faces challenges such as social welfare impacts and short-term economic negative effects. It needs to be carefully coordinated with existing policies and is limited by technological conditions. The current situation is not the best time. Drawing on the experience of countries such as Denmark and Japan, China can design an integrated carbon tax system, such as incorporating existing taxes and gradually increasing low tax rates, to enhance public acceptance. Clarify the tax basis, optimize the collection process and tax incentives to enhance the emission reduction effect. In summary, timely introduction of a reasonable carbon tax policy in the future will effectively assist in achieving China's Carbon Peaking and Carbon Neutrality Goals.

Keywords: Carbon Peaking and Carbon Neutrality Goals, carbon tax, externalities, international experience

1 Introduction

Global climate change poses significant challenges to human development. In 2020, President Xi Jinping proposed China's Carbon Peaking and Carbon Neutrality Goals at the United Nations General Assembly, highlighting the responsibility of a major country. To achieve this goal, efforts need to be made from multiple aspects. Carbon tax is a green tax, with taxpayers being producers or users of fossil fuels, and the tax basis being carbon dioxide or other greenhouse gas emissions. It can effectively correct the externalities of carbon emissions and is a powerful legal regulatory tool that has achieved significant results in international carbon reduction. [1]The carbon tax policies of different countries vary. This article analyzes the international trend of carbon tax and selects representative countries to introduce their carbon tax systems. The aim is to learn from experience, design a carbon tax system that is in line with China's national conditions, build an efficient carbon reduction system, and help

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achieve the Carbon Peaking and Carbon Neutrality Goals. Carbon tax, as an important tool, plays an irreplaceable role in promoting global carbon reduction.

2 The Development Trend and Policy Practice Experience of International Carbon Tax

2.1 The Development Trend of International Carbon Tax

From the practice of international carbon tax, with the establishment of the EU Emissions Trading System and the signing of the Paris Treaty as nodes, it can be divided into three stages: the initial starting stage from 1992 to 2004, the exploratory development stage from 2005 to 2015, and the in-depth expansion stage from 2016 to present.[2]

Initial Start-up Stage. Finland was the first country to attempt to implement a carbon tax. In 1990, Finland introduced a carbon emission tax, which was levied on mineral fuels based on the carbon content in the fuel. Some European countries have also started to impose carbon taxes. Among them, Denmark has a relatively mature carbon tax system and has a good effect on collecting carbon taxes. However, at this stage, only a few European countries have implemented carbon tax collection. In addition, due to the certain impact of carbon tax on industrial development, and the low initial tax rate of carbon tax, as well as the small scale of industries covered, the constraint effect of carbon tax on emission reduction at this stage is not significant.

Exploring the Development Stage. The European Union Emissions Trading Scheme (EU ETS) was established in 2005, which was the world's first carbon emissions trading system. European countries that have previously implemented carbon taxes have joined in and used this as a platform to explore new forms of collaboration between carbon taxes and carbon trading to reduce emissions. In order to better coordinate carbon taxes and carbon trading, countries such as Norway and Denmark have implemented carbon tax reduction policies for companies that join the EU ETS since 2008. During this period, the tax rate and coverage of carbon taxes have become increasingly high, and the restrictions on greenhouse gas emissions have become more apparent. Some countries in Asia and Latin America have also begun to implement carbon taxes, but they are still mainly concentrated in European countries.

In Depth Expansion Stage. The formal signing of the Paris Treaty in 2016 marked a gradual consensus on protecting the environment and addressing climate change globally. Each contracting party began to take various measures to reduce carbon emissions and slow down the process of global climate change. At this stage, more and more countries outside of Europe are beginning to impose carbon taxes. Similar to the previous stage, the tax rate of carbon tax is still constantly increasing, and the

scope of carbon tax coverage has also covered most industries and fossil fuels. The carbon tax has gradually entered the stage of deepening and expanding.

2.2 Design and Practice Experience of Carbon Tax Systems in Various Countries

Due to different levels of development and national conditions, carbon tax policies vary among countries. In terms of tax system, there are mainly three types: independent taxes, and taxes included in environmental taxes or energy and resource related taxes. In terms of taxation scope, it is divided into carbon dioxide, all greenhouse gases, and only fluorine-containing greenhouse gases. In terms of taxation targets, it is divided into all fossil fuel taxation, partial taxation, and taxation on emission facilities. In addition, there are differences in taxation, tax rates, preferences, and usage among countries. The following will summarize and analyze the carbon tax policies of representative countries.

Denmark. Denmark attaches great importance to environmental protection and low-carbon development. Environmental related taxes account for about 10% of total tax revenue, and carbon taxes are implemented as part of environmental taxes. In 1992, Denmark began imposing a carbon tax on households, covering petroleum products, coal, electricity, etc. (excluding natural gas, gasoline, and biofuels), with a tax rate of 13 euros per ton of carbon dioxide. The following year, the scope of taxation expanded to the industrial and commercial sectors, including enterprises that use natural gas, becoming the world's first country to comprehensively levy a carbon tax. To reduce the tax burden, the Danish government provides tax incentives, refunding 50% of income tax and imposing a 10% tax on the excess portion of heavy industry enterprises, with the actual tax burden being 5% of the benchmark tax rate[5].

In 1996, Denmark launched a new plan to set different tax rates based on energy use (heating, production, lighting), while imposing sulfur dioxide tax and energy tax, implementing double taxation on fossil fuels. At that time, the tax incentives were also reduced, but if a company promises to save energy and reduce emissions and passes the audit, it can enjoy a low tax rate of less than 5% of the standard tax rate.. Carbon tax revenue is earmarked for specific purposes, subsidizing enterprise energy-saving plans, and enhancing energy-saving awareness and competitiveness.

In recent years, Denmark has continued to adjust its carbon tax policy and develop long-term energy plans. Denmark has successfully promoted energy conservation and environmental protection through efficient tax tools.

Japan. Japan proposed the "Specific Plan for Environmental Tax" in 2004, and after revision, formed the "Specific Plan for Environmental Tax (Basic Outline)" in 2005, which was scheduled to be implemented on January 1, 2007. The scope of taxation covers fossil fuels such as coal, oil, natural gas, etc. It is taxed based on their carbon content, targeting households and enterprises separately in the production and consumption stages.[3] The initial tax rate is 2400 yen per ton of carbon dioxide.

After its implementation, Japan's carbon tax system has undergone multiple reforms. In 2011, the carbon tax became an additional tax on oil and coal, and the collection method was changed to increase the carbon tax on carbon dioxide emissions from fossil fuels in addition to the original oil and coal tax. In 2012, the "Detailed Plan for Global Climate Change Countermeasures Tax (Carbon Tax)" was introduced, renaming the carbon tax as the "Global Climate Change Countermeasures Tax", and proposing to implement differential tax rates from 2012 to 2016, gradually increasing them. Since October 2012, the tax rates have been adjusted to 250 yen/kiloliter for oil, 260 yen/ton for natural gas, and 220 yen/ton for coal, with a significant reduction in tax rates. The subsequent tax rates will continue to change, and the overall trend is that the tax rates will continue to rise. In order to reduce the burden on taxpayers, multiple tax incentive measures have been taken: a 40% -50% tax reduction for high emission taxpayers who achieve emission reduction targets, a 50% reduction in kerosene carbon tax, and tax exemptions for coal and coke used in steel, cement production, and coke production.

In addition, Japan has also introduced supporting measures to promote the orderly development of carbon taxes, including establishing a green innovation fund to support energy industry innovation, increasing the budget for energy-saving technology research and development, implementing financial subsidy policies to encourage emissions reduction, and establishing a green financial system. Japan's carbon tax covers about 75% of the country's carbon dioxide emissions, effectively reducing domestic emissions and generating tax revenue. It also enhances national low-carbon awareness and promotes industrial technological innovation.

Sweden. The carbon tax in Sweden, as part of the energy tax, began in 1991 as a supplement to the carbon dioxide tax and sulfur tax in the energy tax, and was officially included in the Energy Tax Law in 1992. The tax system design focuses on fossil fuels as the core, first imposing taxes on energy intensive industries, and gradually expanding to other fields, taking into account energy consumers upstream and downstream of the industry, reflecting the "polluter pays" principle. [4] At first, the scope of taxation was relatively narrow, but with the increasing attention to environmental protection and global warming issues, the scope of taxation has expanded to all types of fuel oil.

Sweden adjusts its carbon tax rate annually based on economic development and carbon reduction needs, and the tax rate is on the rise, increasing from 43 euros/ton in 1991 to the current 118 euros/ton, making it the country with the highest carbon tax rate in the world. After 1993, in order to maintain economic development and reduce the burden on taxpayers, Sweden began to set different tax rates for different sectors and purposes, and the tax rate for the industrial sector was slightly reduced.

In terms of tax incentives, the Swedish carbon tax system has a systematic and continuous tax refund and exemption system, with a high degree of refinement. The preferential policies are mainly divided into four categories: statutory exemption category, covering residents' daily electricity generation, heating energy consumption, etc; Statutory exemptions and reductions focus on fuel consumption of transportation vehicles in the fields of waterways, railways, and aviation; Statutory exemptions or

tax refunds focus on fuel consumption during engine operation, metallurgy, and mineral production processes; Statutory tax refunds focus on the reduction and exemption of fuel use in the areas covered by the EU Emissions Trading System. Greatly reducing the burden on taxpayers. At the same time, Sweden has also introduced relevant supporting measures to promote the orderly development of carbon taxes. These measures have effectively promoted the implementation of carbon taxes, reduced obstacles to implementation, and achieved good governance results.

3 The Institutional Choice of Levying Carbon Tax in China under the Carbon Peaking and Carbon Neutrality Goals

The practices of various countries in levying carbon taxes have certain reference significance for China to establish a carbon tax system. Considering the actual situation in our country, it is of great significance to design the relevant factors of carbon tax reasonably to ensure the timely achievement of the "dual carbon" target.

3.1 Incorporate Carbon Tax into Existing Tax Categories for Management and Administration

Given the complex process and legislative issues involved in establishing a new independent tax category, international experience has shown that incorporating carbon tax into existing tax categories is a common choice. China already has mature environmental protection tax and resource tax policies, and carbon tax can be considered for inclusion. Since 2018, China has officially implemented the Environmental Protection Tax Law of the People's Republic of China, and greenhouse gases are not included in the current taxation targets of environmental taxes. The environmental tax has been implemented for six years, with high social acceptance and gradually improving the management system. Therefore, adding greenhouse gases as a new tax item and making carbon tax a part of environmental protection tax can reduce implementation resistance and avoid the problems that may arise from the establishment of new tax categories. This move can not only utilize the existing tax system, but also effectively promote carbon reduction, which is an important way to achieve the Carbon Peaking and Carbon Neutrality Goals.[7]

3.2 Adopting a Low Tax Rate and Setting Tax Rates in a Tiered Manner

Because the introduction of a tax will increase the tax burden on enterprises and residents, to some extent affecting social welfare and producing negative economic effects in the short term. The industries most affected by the introduction of carbon tax are high energy consuming industries. In order to reduce the impact on them and minimize the impact on social welfare and economic development, China should adopt a lower tax rate to impose carbon tax. At the same time, based on China's carbon re-

duction goals and the implementation effect of carbon tax, the tax rate will be appropriately raised in the later stage to promote the transformation of China's energy structure towards cleanliness, promote the development of green and low-carbon technologies, and fully leverage the carbon reduction effect of carbon tax. When determining the carbon tax rate, it is also necessary to fully consider the average carbon price in the national carbon emission trading market to achieve a reasonable sharing of carbon emission costs. [9]

3.3 Reasonably Determine the Tax Basis and Collection Process of Carbon Tax

At present, there are mainly two methods of charging based on fuel and emissions. According to the above analysis, charging based on emissions requires mature carbon monitoring capabilities and technological levels. Levying based on fuel is relatively simple and has lower taxation costs, as this type of taxation only requires measuring the consumption of fossil fuels and then converting carbon emissions based on the characteristics of different fossil fuels. Therefore, if there is no mature and accurate carbon emission statistical monitoring technology in China at the time of the introduction of carbon tax, the first choice is to levy based on fuel, and gradually shift to the method of levying based on emissions with the development of technology.

From the perspective of the collection process, in order to reduce collection costs and improve collection efficiency, during the initial period of carbon tax collection, it is possible to choose to collect taxes in the production process of fossil fuels. Subsequently, with the maturity of carbon emission statistical monitoring technology, the gradual transformation of tax basis, and the continuous improvement of tax collection and management capabilities, the taxation process can also be moved to the consumption process, making the carbon tax more binding on carbon emissions. [8]

3.4 Implement Reasonable Carbon Tax Preferential Policies

Analysis of carbon tax systems in multiple countries shows that they widely adopt tax incentives aimed at reducing the burden on taxpayers, mitigating economic and social shocks, accelerating the acceptance of carbon taxes, and reducing implementation barriers. When formulating preferential policies, the principle of tax neutrality should be followed, and taxes should be returned in a constructive manner to enhance taxpayers' environmental awareness, while avoiding tax distortions caused by repeated taxation. In the initial stage, a wider range of preferential policies can be set, gradually narrowing with the development of carbon taxes to ensure emission reduction effects. Specific discounts can be targeted at: 1. Special industries such as energy intensive sectors to ensure their economic status and international competitiveness; 2. Industries related to national economy and people's livelihood, maintaining social welfare; 3. Encourage enterprises to sign voluntary emission reduction agreements, provide tax incentives and other benefits, and motivate emission reduction actions. [6]

4 Conclusion

The "dual carbon" goal needs participation from governments, enterprises, and the public. A comprehensive legal system for carbon reduction is crucial for carbon neutrality. In the future, the carbon tax system, interacting with emissions trading, will encourage enterprises to upgrade low-carbon technologies. Initially, a favorable tax rate should be set, gradually increasing as China transitions to green, low-carbon, and zero-carbon. Tax revenue should be used as special funds to support, reward, and promote enterprises' R&D in low-carbon, carbon-reduction, and negative-carbon technologies, ensuring a virtuous cycle of carbon tax collection and technology upgrades.[9]

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