The Impacts and Countermeasures of levying Carbon Tax in China under Low-carbon Economy

Wei Zhenxiang\textsuperscript{a*}, Li Weijuan\textsuperscript{b}, Wang Ti\textsuperscript{c}

\textsuperscript{a} Economic management institute, China University of Petroleum, Dongying, 257061, China
\textsuperscript{b} Shengli institute of China University of Petroleum, Dongying, 257061, China
\textsuperscript{c} The master graduate student of China University of Petroleum, Dongying, 257061, China

Abstract

With the intensification of the global climate anomalies, carbon dioxide has become an increasing concern as the major cause of global warming. Levying carbon tax is not only the economic mean to combat global warming, but also one of the important strategies to implement energy conservation and the sustainable development. The paper describes the necessity of levying carbon tax and progress of carbon tax at home and abroad, and then analyzes the impact of introduction of tax based on Tax Economics from micro and macro level. Finally, puts forward corresponding countermeasures.

Key Words: Carbon Tax; Micro; Macro; Tax Economics

1. The necessary analysis of levying carbon tax in China

1.1. It is the necessity of reducing domestic pressure on ecological environment

According to the 2007 “China's National Climate Change Program”, in 2004 there are about 5.07 billion tons of carbon dioxide emissions in China, global greenhouse gas emissions ranked second, and carbon dioxide emissions in per capita are about 3.65 tons, which is equivalent to the 87% of world average. By 2020, China’s greenhouse gas emissions are likely to the first of world. Climate change is restricting China’s economic and environmental sustainable development and harmonious society.

* Corresponding author. WeiZhenxiang Tel.: 13505462212
E-mail address: weizhenxiang88@163.com.
1.2. It is the necessity of coping with international carbon tariffs

To achieve the “carbon trade protectionism” and “carbon trade discrimination”, the United States levied carbon tariffs. Therefore, levying carbon tax in China has two positive effects: on the one hand, carbon tax can promote China’s enterprises conserving energy and reducing emission, so that emission reductions below the level of the importing country in the same industry to avoid being levied tariffs. On the other hand, the prohibition of double taxation under the WTO principle makes the United States carbon tariff could not be implemented.

1.3. It is the necessity of perfecting China’s environment tax revenue system

At present, there are taxes related to environmental protection such as resources tax and consumption tax, but for the environment, control efforts are weak, so the effect is not good. Carbon tax as an independent environmental tax can increase the control efforts on carbon dioxide emissions, made up of lacking of resources tax and consumption tax, while levying carbon tax reduced some of the distortion taxes, thereby improving and enhancing the tax structure.

2. The progress of levying carbon tax both in China and other countries

2.1. The progress of international levying carbon tax

At present, there are many countries have implemented carbon tax or energy tax policy such as Finland, Denmark, Netherlands, Norway, Sweden, Germany and Canada and other countries. In 1990, Finland took the lead in the establishment of a global carbon tax to replace income tax and service tax. In 1991, Norway levied carbon tax for 65% of all carbon dioxide emissions. In 1991, Sweden began to levy carbon tax, during 1987 and 1994, the Swedish carbon dioxide emissions reduced 600-800 million tons, down 13% overall. In 1993, Denmark began to levy carbon tax for industries and families. In 1999, Germany began to levy carbon tax for vehicle fuel, natural gas and electricity, and taxes were used to replenish the employee pension. In 2001, the United Kingdom levied 15% additionally because of the Climate Change, which, for commercial and public sector standards of taxation subject on energy costs. 0.3% of income tax revenue returned to the employer's national insurance accounts, part of which for the re-investment in energy efficiency and conservation technology. In 2008, the Canadian province of British Columbia (BC) became the first region to levy carbon tax from the final consumer in North American.

2.2. Policies and regulations of Chinese carbon tax

Carbon tax as an environmental tax attracted much attention as early as 2002, National Bureau of Statistics of both China and Norway jointly searched on the “carbon tax on the Chinese economy and greenhouse gas emissions” and came to a conclusion that Carbon taxes would worsen the economic situation in China, but the carbon dioxide emissions would decline. China clearly official stated view of carbon tax China Energy Sustainable Development Forum meeting in 2009. Su Ming, the officer of the Ministry of Finance Branch proposed China is considering the tax scope. After the meeting in Copenhagen, China admitted our responsibilities of carbon dioxide emissions and put the task of controlling carbon dioxide emissions into the ‘twelfth five-year plan’. The research report of National Development and Reform Commission, Ministry of Finance analyzed the necessity and feasibility levying carbon tax.
3. Impacts of Carbon Taxes in China

3.1. Impact on the Micro

The micro effects brought by carbon tax are mainly three aspects, which are producers, consumers and investors. And the effects include income and substitution effects. The following is specific analysis for impacts on producer, consumer and investment.

Firstly, it is undeniable that in the prophase of levying tax, carbon tax would adversely affect the business. It means increasing the production costs as long as levying tax. Chart 1 is about producer's income effect caused by levying tax.

The income effect of taxation on producers is mainly reflected in: Government takes part of the enterprises' income through levying carbon tax, thus reducing the available resources of enterprises, which causes the final output reduced. Chart one shows that, levying carbon tax reduce the available resources, thus their production possibility curve may be moved from PPF1 to PPF2, which made the number of products drop from $a_1a_2$ to $a_1^*a_2^*$. The impacts are two aspects: one is change in output, if there are not enough available resources, corporate production will sharply decline; the second is the sustainable development of enterprises. If the government levies carbon tax rates too high, making the lowest point above enterprises’ average variable cost curve, enterprises will abandon producing or even apply for bankruptcy. Therefore, carbon tax on producers depends on the degree of tax rates.

Secondly, the impact on consumers is mainly passed on about business taxes. Supply and demand elasticity is the most fundamental factor to determine which level of the tax passed on. In general, under the same conditions, the greater elasticity of demand, the fewer proportion of buyers to pay taxes whereas the greater proportion of taxes paid. People have small elasticity of demand for coal, but have greater elasticity of demand for natural gas and refined oil. The final result is producers and consumers jointly undertake the tax, but obviously tax burden of enterprises is greater than the residents. Chart 2 shows that, before levying tax, the supply curve and the demand curve intersect to a point E, equilibrium price is $P_0$. After government levying tax the industry supply curve changes from S to $S^*$. The revenue $T$ equals to the amount of producers’ declined price plus consumers’ raised prices, diagram $P1E^*BP2$ is the total carbon tax levied by the government, in which diagram $P1P0AE^*$ means the taxes consumers bear, while $P0P2BA$ part is undertook by producers.

Thirdly, the main impact on investment comes from returns. Tax on business investment plays an important role in decision-making. Different levels of risk in project are asked to different return rate on investment. The impact of carbon tax on investment is mainly in carbon finance, such as through green financial attracting foreign investment. Industrial Bank in January 2009 established the specialized
business of sustainable financial institutions — the sustainable financial center. The Bank is responsible for energy efficiency financing, carbon finance and environmental finance and other areas of business management and product marketing. In June 2010, Minsheng Bank of China set up a “green business financial service center” in Beijing. Its focus located in the national industrial policy to encourage energy-saving environmental protection, new energy, low-carbon industry and other fields, aiming to develop low carbon forms of financial innovation products. Therefore, levying carbon tax makes investors more concerned about the environmental protection industry and also widened the financial institutions in raising capital of low-carbon finance.

Fig. 2. Effect Analysis of Carbon Tax

3.2. Impact on the Macro

Firstly, impact on economic development. Theoretically, carbon tax may slow down the speed of China’s economic growth to some extent. But the Director of Energy Research Institute of the National Development and Reform Commission, who is called Jiang Kejun said that the carbon tax on the whole is limited to GDP, the highest is about 0.45%. Gao Pengfei (2002) considered that carbon tax will lead to GDP loss larger, but there is an optimal tax rate. If tax rate is high, the effect of reduction is no longer significant, and GDP loss increased dramatically at the same time. Chart 3 is a diagram showing how tax indirectly affects economic growth by affecting demand.

Fig. 3. The Impact on Economic Development

When social demand changes from AD to AD*, balanced production of society will be changed from Y to Y*. According to tax principles of economics, the tax multiplier is \(-\frac{c}{1-c}\), indicating that tax and GDP change in the opposite direction.

Secondly, impact on income distribution. Tax is defined as a form that countries in order to meet public needs of society using public power law and tax instruments to distribute and redistribute the national income and product mandatory and free to obtain financial. Its main purpose is to distribute and redistribute the national income and product to narrow the gap between the rich and poor. Carbon tax income may be distributed to minimum earners by means of transferring payment or through controlling
the taxpayers' actual money purchasing power to adjusting income distribution, and finally achieve the purpose of improving the whole social income distribution.

4. Suggestions of Completing Levying Carbon Tax

4.1. Design carbon tax system reasonably

Firstly, determine the object and scope of levying carbon tax flexibly. Currently, the NDRC and the Ministry of Finance presented the scope of levying carbon tax clearly that is during producing, operating and living, there are direct emissions of carbon dioxide to the natural environment due to consumption of fossil fuels, and the taxpayers are mainly companies and individuals who use coal, oil, gas and other fossil fuel. But in the actual process, there is still a gap between prediction and reality; it should be treated flexibly, not across the board. Secondly, develop a reasonable rate. From theory, there is an optimal carbon tax rate. From the financial income perspective, government taxes make private available resources reduced and have a negative impact on economic growth. From financial expenditures, the government provides public goods improving the operating environment of the private sector and its efficiency of resource allocation. Therefore, tax has a negative effects on financial income and positive effects on financial expenditure. In view of this, the paper recommend the following two points: First, assure the reasonable carbon tax rate to minimize the negative impact that is able to maximize reflect the marginal cost of emission carbon dioxide; second, the tax rate should take the macroeconomic and industry competitiveness into account. At the same time, carbon tax rate should be different for different groups. Thirdly, make full use of tax redistribution. Most of the levied carbon tax will be the central tax. On the one hand, after entering into the state treasury, it is used for the livelihood of the people and infrastructure construction, which can also reduce other costs of business. On the other hand, carbon tax can subsidy part of the low carbon technology companies and low income groups to slow down the adverse impact.

4.2. Choose a correct way to levy carbon tax

Firstly, carry out a progressive tax rate. Levying carbon tax is presented in 2009 in China. Although scholars began to research it much earlier, the time of the real consciousness of public is very short. Therefore, in the prophase, carbon tax should be set to a low level and be levied step by step, gradually transiting to the optimal rate aiming to slow down the impact of carbon tax and raise awareness of the acceptance level. Secondly, abide by the principle of tax neutrality. In the process of levying carbon tax, we can consider various tax reforms, which in turn provide space for carbon tax to ensure levying carbon tax revenue under the neutral principle. Learn from international experience, we can choose alternative tax rebates and tax substitution, to reduce the negative impact on national economy and ultimately access to environmental effects and income distribution effects. Thirdly, coordinate the relationship between related taxes. We should consider the relationship between carbon tax and other taxes; avoid levying double taxation on the same object and conflicts. Associated with the carbon tax are energy taxes, emission taxes and environmental taxes. These taxes are cross-linked, but there is a common point that they all can levy fossil fuels tax. Therefore, the country should adjust scope of related energy taxes after crystallizing levied scope and reasonably collect.

4.3. Perfect the supporting measures of levying carbon tax
Firstly, strengthen the coordination of the management. Since levying carbon tax is difficult involving many sectors, it requires the tax authorities, energy sector, transport sector, environmental protection department and other departments to establish a condominium system to ensure the carbon tax levying work proceed smoothly. Secondly, strengthen the propaganda of carbon tax. For many groups involved in levying carbon tax, it is necessary to make the group recognize the need of levying carbon tax and their responsibility to pay the carbon tax. Strengthening the propaganda of carbon tax can help improve the degree of awareness and support of carbon tax to guarantee levying carbon tax smoothly.

4.4. develop carbon emissions trading vigorously

Lee (2008) put forward that “Although carbon taxes have a negative impact on GDP, it can pull GDP growth with emission trading.” In 2008, China established three environmental rights trading institutions that are Beijing Environment Exchange, Shanghai Environment and Energy Exchange and Tianjin Emission Exchange. They provide a platform for China’s carbon emissions trading. In the current economic structure, there are two effects of introducing carbon emissions trading scheme: first, energy, mining and other large enterprises can depend on carbon trading mechanisms to sell carbon dioxide emission from technical innovation to mitigate the rising costs brought from carbon dioxide emissions. It can compensate for the carbon tax to enable enterprises to develop in the direction towards to low carbon. Second, carbon emissions trading market can improve the low-carbon investment to develop the carbon finance market and open up new areas for investment.

5. Conclusions

China is still in the late stages of heavy industry when the use of coal accounts for large proportion of the energy structure and clean energy technologies to be improved further. Therefore, carbon tax as part of our tax system has become a necessity. Currently, levying carbon tax is both an opportunity and a challenge to china and should consider all to find the key point between negative effects and positive impact.

References