

The Way for China to Implement Carbon Emission Policy

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ABSTRACT

China has established five centers around the nation to conduct the carbon trading[1]. As China's economy recovers from Corona Virus, it needs to pay attention Researching the promising strategy for China to solve carbon emission problems. In this essay, the major economic tools is margin analysis about carbon trading and carbon tax policy. It cites the case of different countries and measures the cost and benefit. From those analysis, it suggests China should expand the market for carbon pricing and consider the future use for carbon tax.

Keywords: *Carbon tax, Carbon pricing, Economics, China*

1. INTRODUCTION

In this year, the world suffers from the most severe epidemics-Corona Virus. Besides, other catastrophes also emerged around the world: California wild fire, Locust disaster. This virus significantly influences various aspects of different countries. Why if there will be more virus in the future[2]? According to BBC News, the global warming has a strong correlation with diseases underneath the earth. As the earth warms, more permafrost will melt. Under normal circumstances, each summer, the shallow permanent layer melts about 50 cm deep. But now global warming is gradually exposing the older permanent layers[3]. Frozen permafrost is the ideal place for bacteria to survive for a long time, perhaps only a million years. This means that melting ice may open Pandora's box of diseases. Therefore, solving global warming problem is an unavoidable issue. Carbon emission plays a vital role in affecting the global temperature. China's carbon emission is comparatively high than most of developed countries (from World Bank's data). Affected by the virus, massive factories and airlines shut down from January of 2020. According to Carbon Brief, "China's carbon emissions fell by about 25% in four weeks of the end of March 2020, equivalent to about 200 million tons of carbon dioxide (MtCO₂). Demand has slowly returned to normal levels over a seven-week period, with emissions reductions so far of about 2,500 tonnes of CO₂, or about

18% below normal levels." [4] However, as the China's economy returns, controlling carbon emission becomes more important for China. In fact, China has launched five Carbon pricing centers in differs regions, but these policy is not enough to control the environmental danger brought by carbon emission. What should China do next to implement correct policy?

2. NECESSITY TO IMPLEMENT SOME POLICY

First, on a global scale, why does carbon emission reduction require the cooperation of all countries? One view is that carbon emissions are, in a sense, a Global Public Bad, similar to our definition of public goods, and we believe that carbon emissions are non-exclusive and non-competitive. This will lead to a lack of willingness on the part of a government to pay for global emissions reduction targets. The figure 1 below is of Australia, for example, and of course it applies to China: based on the principle that marginal revenue equals marginal cost to determine the optimal scale of emission reduction, we will find that the optimal scale of emission reduction for the world will be Q_w, and for a country the optimal scale of emission reduction will be Q_a, Q_a is smaller than Q_w. Therefore, in international cooperation, a country often lacks the will to reduce emissions.

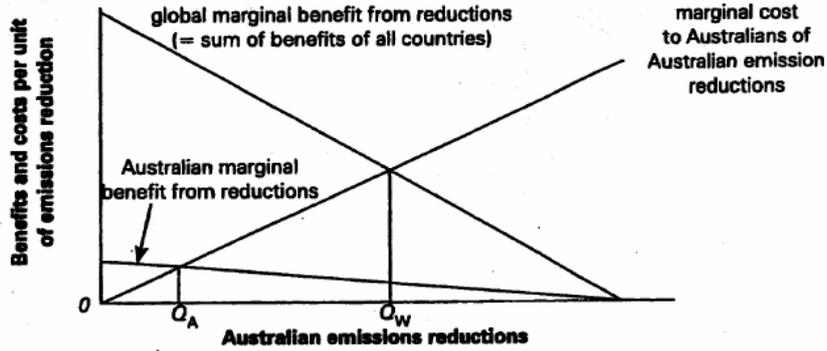


Figure 1. Model of Australian emissions

3. SOLUTIONS

For those who have participated in their own emission reduction expenditures exceeding emission reduction benefits, compensatory payments should be made to enhance the understanding and understanding of emission reduction cooperation between participating countries. What kind of emission reduction cooperation framework would be more efficient?

Test emission reduction scale is established when the marginal emission reduction cost is the social carbon

emission cost, i.e. $MAC=SCC$. Germany and Sweden are two examples. As shown in figure 2, Germany's marginal emission reduction costs (MAC) are lower than Sweden's due to factors such as its high level of technology, so by trading some emissions targets through the Carbon Trading Mechanism (ETS), Germany's emission reductions will increase to R, while Sweden's emission reductions will be reduced to R. Through the transaction, the growth of the total social welfare between the two countries is the size of the green shaded part of the graph.

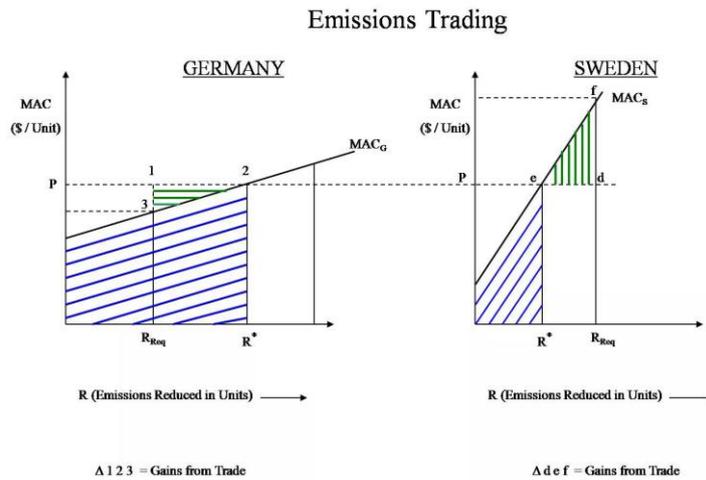


Figure 2. Comparison of emission trading in Germany and Sweden

4. THE EFFORTS AND PROBLEMS

The Kyoto Protocol in 1997 set internationally tied targets for reducing greenhouse gases by 5 per cent from 1990 levels by 2010. The plan calls for developed countries to take on a heavy responsibility, emphasizing common but differentiated responsibilities. The main cooperation mechanisms for the Kyoto Protocol are the International Emissions Trading Joint Implementation Mechanism Clean Development Mechanism to encourage developing countries to use carbon emission targets in the same way as developed countries Swapping financial compensation to boost its own new energy

technology. In fact, the Kyoto Protocol has not been implemented well, only the European Union has met pre-set emission reduction targets, other countries have failed to implement them for a variety of reasons, and the US has not signed the agreement at all. The embarrassing implementation of the Kyoto Protocol is mainly due to the following reasons: Firstly, in-emission reduction costs are too high. Secondly, legally binding and timely participation are needed in the failure to meet emission reduction targets and no punitive measures. Thirdly, incentives for developing countries are inadequate. Here is a look at the problem from a domestic perspective, is divided into two main categories in terms of a country's policy: Executive orders: measures such as setting

emission reduction standards and setting a minimum use of clean energy, in the case of setting emission reduction standards. Market-oriented measures: including price-based carbon tax, quantity-based carbon trading mechanism (ETS) and so on. There are two manufacturers, and their respective

marginal emission reduction costs are shown in the figure 3. In the case of setting emission reduction standards (required to reduce emissions to 5 units each): emission reduction costs are the dark blue shaded area in the figure 3.

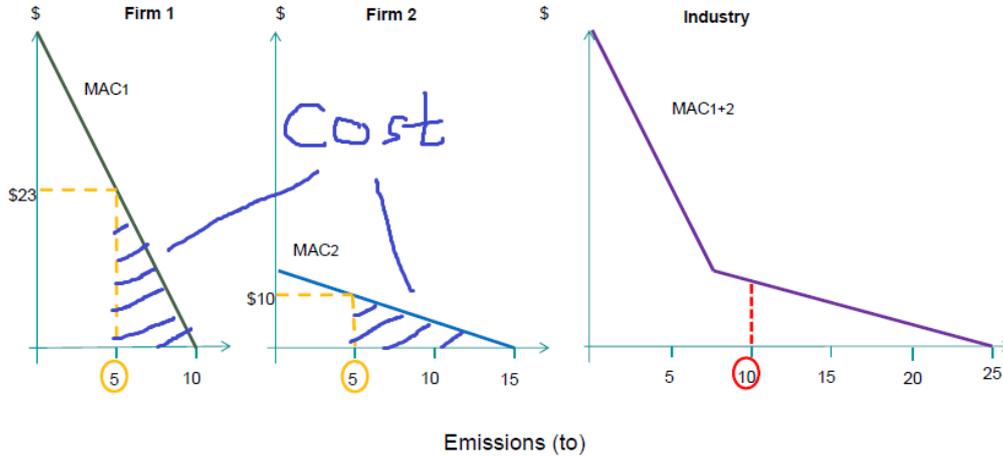


Figure 3. MAC before trading

In the case of market-oriented measures, that is, the implementation of carbon emission indicator trading, the two parties will negotiate and reach an agreement. Manufacturer 1 will reduce emission reductions, and manufacturer 2 will expand emission reductions. At this time, the emission reduction costs are light blue in the figure 4 below. Therefore, compared with the situation of government regulation, the market-oriented measures will obtain the net benefit of the dark blue area in the figure 5

below. The basic theoretical basis of this analysis is Coase Theorem, that is, under the condition that the transaction cost is zero and property rights are fully defined and implemented, external factors will not cause the misallocation of resources. Because on this occasion, the parties (producers and consumers of external factors) will be driven by a market to negotiate mutually beneficial transactions, that is, to internalize external factors.

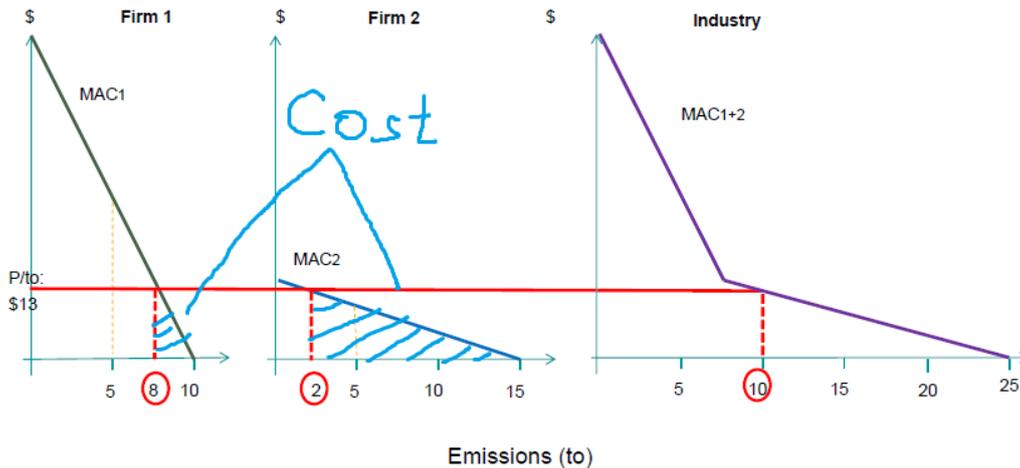


Figure 4. MAC after trading

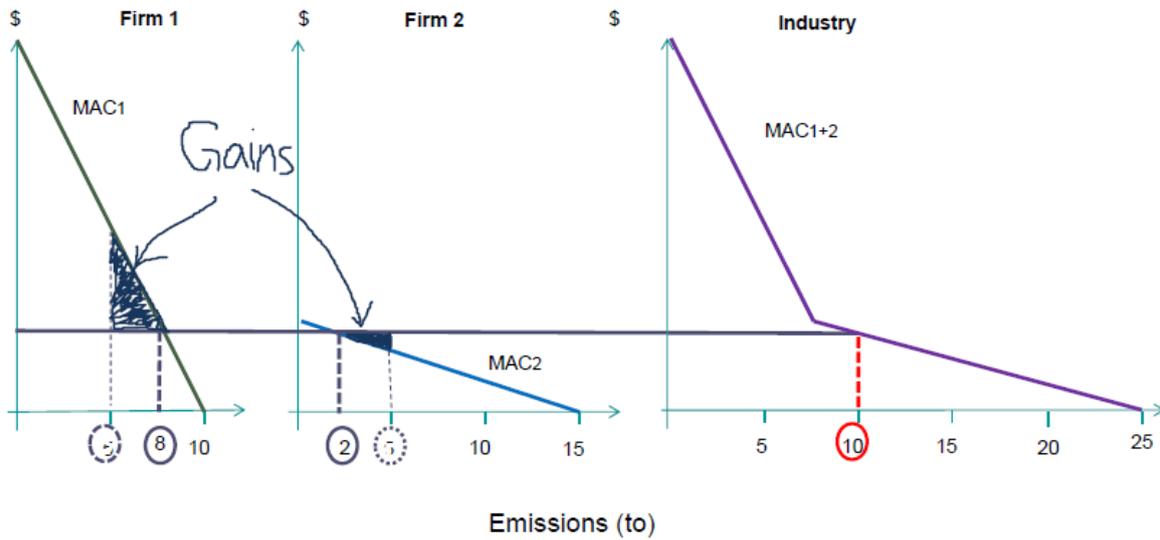


Figure 5. Gains in the trading

5. COMPARISON BETWEEN CARBON EMISSION TAX AND CARBON EMISSION TRADING

Secondly, it is about the choice of price-based method (carbon emission tax) and quantity-based method (carbon emission trading). In a perfect assumption, these two situations will form a cross-border, cross-organization, common and efficient price signal. They can achieve the same purpose, if emission reduction activities will continue until the marginal cost equals the marginal benefit; inter-organizational price signals can be formed at any given time; the marginal cost and marginal benefit of emission reduction are determined

However, in reality, the marginal cost of abatement for a manufacturer is often uncertain. Therefore, these two market-oriented approaches have their own different applicable scenarios. Price-based means that the carbon emission tax is suitable for long-term emission reduction actions, that is, the marginal revenue curve is relatively flat relative to the marginal cost curve. As shown in the figure6 below: the red area is the tax efficiency loss, the blue area is the efficiency loss when using carbon emissions trading, and the red area is smaller[5]. Price-based means that the carbon emission tax is suitable for long-term emission reduction actions, that is, the marginal revenue curve is relatively flat relative to the marginal cost curve. As shown in the figure 7 below: the red area is the tax efficiency loss, the blue area is the efficiency loss when using carbon emissions trading, and the red area is smaller[5].

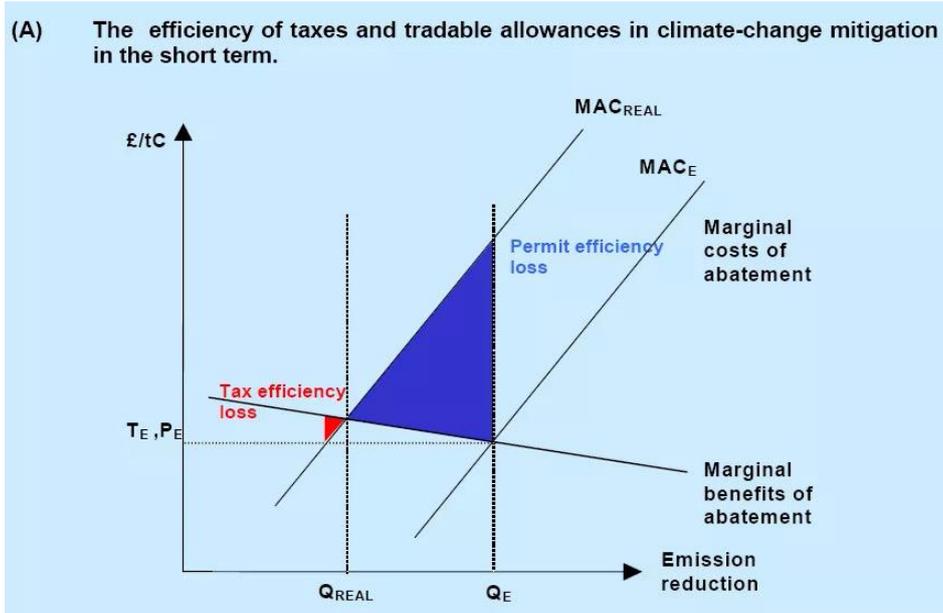


Figure 6. The efficiency of taxes and tradable allowances in climate-change mitigation in the short term

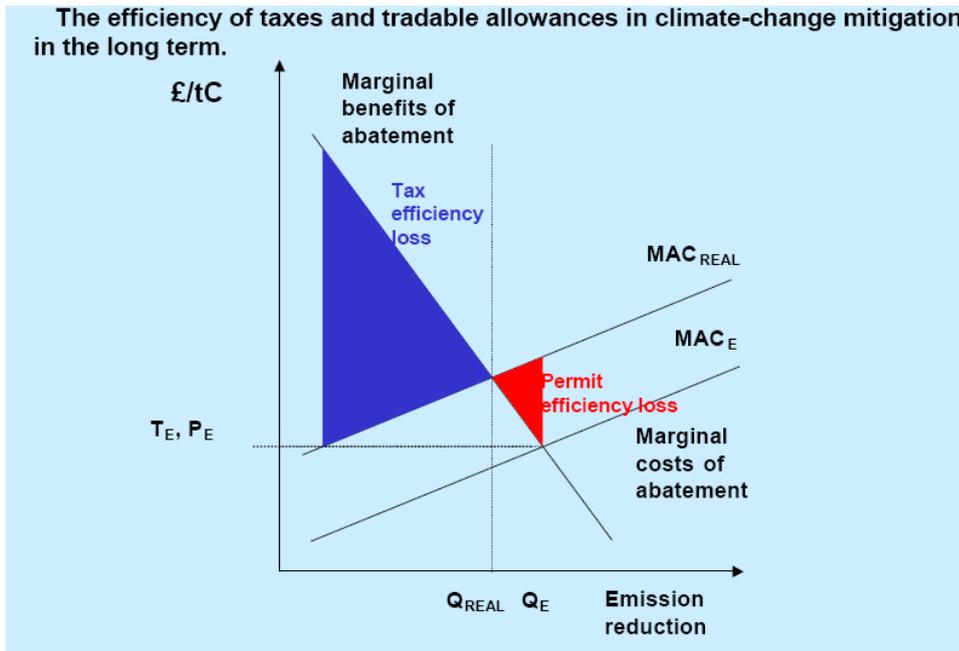


Figure 7. The efficiency of taxes and tradable allowances in climate-change mitigation in the long term

In actual application, the following points are very important: policy makers can distinguish short-term and long-term emission reduction targets, but short-term emission reduction actions need to be consistent with long-term goals. There is some flexibility in setting short-term emission reduction targets. In general, effective market-based emission reduction actions should meet the following criteria: The price signal must reflect changes in the marginal loss caused by emissions and be consistent across the organization; emission reduction should be carried out in the most cost-efficient areas, but there should be corresponding compensation; the funds raised can

promote redistribution to influence the development of industry. The carbon tax meets the standards of efficiency and public finances, but does not meet the standards of fairness, because carbon taxes cannot spontaneously form transfer payments to developing countries. In comparison, Emissions Trading (ETS) meets all three standards. Regarding the allocation of carbon emission indicators (Emission Credit), there are mainly the following two methods: 1. Free permit allocation 2. Auction (Auction-based permit allocation system). Among them, the method of free distribution is more complicated,

transaction costs are high and accurate value judgments are required, which may distort competition. Compared with free competition, auctions are more transparent and have lower transaction costs. They are suitable for countries with a standardized legal system. At the same time, they can increase fiscal revenue and achieve tax neutrality between the purchase of quotas and capital expenditures in the emission reduction method. At the same time, international carbon emission allowance trading is crucial to the effective implementation of domestic trading mechanisms: reduce emission reduction costs and carbon price fluctuations; provide financial support to developing countries with lower emission reduction costs; provide a platform for the formation of a transnational unified carbon price for trade export-oriented industries. Of course, a small country can only be a price taker under this system.

6. CONCLUSION

As a result, should we keep proposing China to implement carbon tax or carbon pricing? From my perspective and analysis before, I suggest China could implement both strategies in a slow rate. For carbon pricing, the effective method as a short term way, China could keep expanding the role of quantity of carbon trading mechanism (ETS). For carbon tax, government should take a serious consideration for how to implement it properly to completely replace the carbon pricing. What about implementing tax on the fossil fuel rather than carbon emission? Should customers take some responsibility to pay more carbon tax? Only implementing short-term way in a right track and make meticulous consideration for carbon tax, is the correct solution for most of country and China. Furthermore, this article does not mention the emerging solutions for climate change and does not consider the politics situation China encounter. For future research it should make comprehensive analysis for different tools to solve the climate change.

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