

## **Carbon trading and its provincial economic impact: a multi-regional Input Output analysis**

Topic: Regional Input-Output Modeling

Author: Yan Xia

In the 12th Five-Year Plan of China proposed in 2011, China carried out the target to reduce its economy's carbon intensity by 17 percent by 2015 compared to 2010 levels. To achieve this goal, seven carbon emissions trading pilots have been established to find a way for the unified national carbon trading market. China is featured by diversity of natural environment and resources and spatial heterogeneity of social-economic development because of its large scale of territory. In China, regional differences and interregional economic linkages have played key roles in China's regional economy development and spatial structure formation. To get a national target, each region will have a different contribution. In the 12th Five-Year work program of energy conservation and emission reduction, a set of regional emission targets have been proposed. Difference of initial quota allocation and emission reduction cost among provinces in China is the driving force of unified national carbon trading market. The initial quota allocation of carbon permits will have important effects on regional economic development, industrial structure and interregional trading. Therefore, the allocation of the emission reduction target at the provincial level may not only take regional economic development into consideration, but also the regional reduction potential to achieve the goal, while at the same time emphasizing regional equity and a regional development strategy.

This paper attempts to simulate the unified national carbon trading market through provinces with a multi-regional CGE model in China. It concerns different initial quota allocations and their effect on regional economic. Commonly there are three principles in initial quota allocation: equity principle, auction principle and current production principle. In the model, four scenarios are designed: one is free allocation by grandfathering, that is, a region receives quotas based on historic performance according to equity principle; the second is auctioning of quotas with revenues recycled as lower VAT, this model assumes the government budget balances, so the exact amount rebated in lower VAT will also partly reflect changes in economic output and the tax base; the third is allocation of quotas relative to current production, which means disguised subsidies and will encourage regions to improve production efficiency; the last one is allocation of quotas according to the pre-given emission reduction target in the 12th Five-Year work program of energy conservation and emission reduction, through comparing with other three scenarios, we can evaluate the feasibility of this policy.

Different economic effects will be investigated under these four scenarios from the view of regional economics. Cost efficiency is the primary factor to appraise the different allocation schemes, and then we use a modified Gini Coefficient to see if it will narrow the gap between east China and west China. Social welfare loss minimization is also one of the evaluation criterions. Besides, it will also have an observation on VAT change, terms of trade change, real wage and employment in each region.