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Rethinking Environmental Tax and Carbon tax: A Comparison Based on Cost-Benefit Analysis in China

Zhou Meifang [1], Liu Yu [2*], Yang Shunxiang [2], Zhang Jinzhu [3], Li Xinbei [2], Zhang Wei [4]

1 School of Economics, Beijing Technology and Business University
2 Institutes of Science and Development, Chinese Academy of Sciences (Corresponding Author)
3 School of Economics and Management, Beijing Forestry University
4 Environmental Planning Institute of the Ministry of Environmental Protection, National Key Laboratory for Environmental Planning and Policy Simulation

ABSTRACT

Air pollutants and carbon emissions are both mainly derived from energy consumption. As important policy instruments for emissions reduction, the relationship between environmental tax (SO2- and NOX-) and carbon tax (CO2-) calls for more research. This paper compares cost-benefits of environmental tax and carbon tax under same level of GDP loss, carbon emissions reduction and carbon emissions intensity decline. A computable general equilibrium (CGE) model of China with 139 sectors based on 2012 China's input-output table and statistical data on environment has been developed for this purpose. Simulation results show that current environmental tax in China is effective to reduce emissions (SO2 -1.34%; NOX -1.04%; CO2 -0.71%) with mild impact on GDP (-0.16%). In particular, given a constant GDP effect, current environmental tax equates to a carbon tax of 19 RMB per ton, but carbon tax would be more efficient than environmental tax to reduce CO2 emissions (-0.89%). If given a constant CO2 emission effect, current environmental tax equates to a carbon tax of 15 RMB per ton, while carbon tax has smaller impact on GDP (-0.12%); however, in terms of air pollutants reduction, carbon tax would be less efficient (SO2 -0.52%; NOX -0.61%). If given a constant carbon emission intensity effect, environmental tax is less cost-benefit than carbon tax. Impact on sector level are also discussed. The study suggests that the 'embodied' carbon tax in environmental tax policy should be considered if China apply a carbon tax in the future.

Keywords: environmental tax, carbon tax, CGE model, cost-benefit

NONMENCLATURE

Abbreviations	
APEN	Applied Energy
Symbols	
n	Year

To editors and reviewers: sorry for can only submit abstract at this moment, we will finish the manuscript by final paper due date if are accepted to the conference. Thanks!

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