

The Role of Trade in Carbon Leakage: Evidence from Spatial Econometric Models

Jie He¹, Jaime de Melo², Haisheng Yang³

Abstract

The difference in the carbon control efforts across countries is considered by many as the source of the so-called “carbon leakage phenomenon”. Preoccupation about carbon leakage has been an important argument that led the United States not to participate in the Kyoto Protocol. It also pushed the European Union to propose a list of sensitive sectors to be excluded from the EU Emissions Trading System (EU ETS). Some evidence, using input-output techniques or average emission intensities, lends support to this carbon leakage phenomenon ([1],[2]). Recent studies focusing directly on the role of the stringency of trade-environmental regulation also give some support, but they have relied on rough proxies to capture the stringency of environmental policies. Neither have they addressed satisfactorily the potential endogeneity of regulatory measures [3].

This paper extends the evidence by resorting to spatial econometric methods not used so far. These methods link directly CO₂ emissions across countries by using a bilateral trade-related weighted matrix. The underlying assumption is that the linkage in the CO₂ emissions between two countries should be dependent on the strength of bilateral trade. This framework is helpful to disentangle the potential causal relationship between CO₂ emissions across countries via the channel of international trade. This approach allows one to capture statistically an average reaction coefficient that measures how CO₂ emissions across countries are linked by the strength of their bilateral trade. Preliminary results show that a country’s per capita CO₂ emissions are negatively and significantly affected by the CO₂ emission of its partners the other countries, weighted by the ratio of its net import from them. Estimates also suggest that in a Green-Solow style model, the international trade actually reinforces the tendency of divergence of the CO₂ emission growth rate between developed and developing countries. For the developing countries, international trade actually increases their CO₂ emission growth rate while the opposite tendency appears for the developed countries.

Keywords: Carbon leakage, Spatial econometrics matrix, bilateral trade, trade structure, carbon efficiency difference, carbon intensive and less intensive sectors.

[1] Peters, et al (2011) « CO₂ embodied in international Trade with implications for global climate policy », Proceedings of the National Academy of Sciences

[2]Sato (2014) « Product Level Carbon Embodied in Bilateral Trade », Ecological Economics

[3] Grether, J.M., N. Mathys, J. de Melo (2012) « Unravelling the World Wide Pollution Haven Effect », Journal of International Trade and Development, 21(1), 131-62.

¹ Département d’Économique, Faculté d’Administration, Université de Sherbrooke, Sherbrooke, Canada, and FERDI, jie.he@usherbrooke.ca

² FERDI and university of Geneva, Switzerland

³ Sun Yat-Sen University, Guangzhou, China