

Growing green: The role of the Emissions Trading System on the dynamics of CO2 efficiency in Europe

Topic: (6.6) Structural change and dynamics (2)

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Since Leontief and Ford's (1971) work on energy use, structural decomposition analysis (SDA) has been the main methodology in input-output to assess the evolution and role of economic variables in environmental issues. However, a major drawback of the latter is its pairwise comparison of steady-states instead of their dynamics through time. The temporal Leontief inverse (TLI) introduced by Sonis and Hewings (1998) solves this issue by accounting for the structural economic changes observed within the given time interval and their contribution to the current steady-state. Based on a time-series of input-output tables, the TLI embeds discrete time changes in the local economy into an adjustment process of the initial Leontief Inverse. We can then trace the evolution path of change identifying each year's effect in what can be considered a temporal decomposition of change. By combining this technique with hybrid environmental input-output models, we can derive insights about the role of the structural change and the dynamics of production technologies in the generation of environmental externalities. As a result, in this paper we develop a hybrid temporal Leontief inverse model for assessing the process of structural change on greenhouse gases CO2 emissions that has occurred in the EU during the time period 1995-2009. Exploiting the information available at the World Input-Output Database (WIOD), we evaluate and compare trends before and after the introduction of the Emissions Trading System (ETS), and also the role of modern production chains in displacing environmental footprints.