

## **Tracing Environmental Footprints along Global Value Chains by Routes, Production Layers, and Border-crossings**

Topic: Input-Output Modelling: Trade and Global Value Chains Policies - I

Author: Meng Li

Co-Authors: Bo MENG, Yuning Gao

The nations and sectors are more closely connected to one another than ever before in an age of global value chains (GVCs), which are defined by production fragmentation and vertical specialization, and the composition of trade has become increasingly complicated. All GVC research places a strong emphasis on the challenges that production dispersion and border incursions have brought to our understanding of the economy. However, very few of them have attempted to explain precisely how economic and environmental effects are transferred from one GVC to another through the various phases of production and border crossings. Here, we examine the transmission of environmental imprints using the Inter-Country Input-Output (ICIO) tables of the Organization for Economic Cooperation and Development (OECD) and the associated satellite data. Starting from the multi-regional input-output model (MRIO) and the forward production linkage-based decomposition, we separate the roles of each route, a production layer and border-crossing. We develop the first Routes-Layers-Boundaries accounting framework that, to the best of our knowledge, can trace environmental footprints along global value chains and demonstrate how emissions, pollution, and other environmental stressors are transferred along various GVCs by traversing production layers and international borders from one country/sector to another. This research contributes to a better understanding of the complicated production systems that lead to the origin and absorption of environmental impacts in various nations through GVCs.