

## Degrees of separation and carbon embodied in China's supply chain networks in processing exports and normal production

Topic: Firm Heterogeneity and Input-Output Analysis

Author: Guadalupe Arce

Co-Authors: Luis A. LOPEZ, Xuemei Jiang

China's processing exports account for around half of its total exports and is concentrated on a few products, different from non-processing trade. At the same time, carbon embodied per unit processing exports in China is significantly lower than carbon embodied per unit non-processing exports, because they have less connection with domestic industries and lower domestic emission intensities (Dietzenbacher et al., 2012). In recent years, the share of processing exports in total exports of China keep decreasing, reflecting the structural change that is taking place in China that is increasingly adding value to imports rather than simply processing raw materials. In this context, we wonder about the consequences of these changes in terms of emissions embodied in trade and the differences in the emissions associated with both types of trade and how those differences are explained.

For it, in this paper we propose a Structural Path Analysis (SPA) to analyze China's processing exports and the related emissions and the differences with non-processing exports using the ICIO tables for 2011. SPA is used to identify the contribution each part of the value chain (Jing et al., 2015; Owen et al., 2018; Skelton et al., 2011; Zhang et al., 2017a), identifying key flows and industries, that drives the consumption-based accounting (CBA) emissions that are embodied in China's exports meeting the final demands of developed and developing countries, distinguishing the investment and consumptions demand. In a second step, we combine the embodied emissions flows resulting from applying the SPA with the complex network approach, using the community concept to identify the driving forces of virtual carbon in processing and non-processing trade and the main clusters of sectors and production phases. This joint analysis is appropriate for assessing the importance of layers or degrees of separation between companies from different sectors in the transmission of virtual carbon embodied in trade, which is an important novelty in the input-output literature.