# Carbon Emissions in GVC and Pollution Haven Hypothesis

Topic: China's (Inter)provincial Input- Output Tables: Applications and Advances
Author: Yan XIA

Chinaâ€™s flourishing economic growth, increasing energy consumption and carbon emission has been extraordinary regional differentiation problem for structure of a nationâ€™s economy, physical geography, resource endowments, and other factors. The fragmentation of production across national and regional boundaries is a defining feature of the modern interregional economy. This calls for new measures to analyse trade patterns and embodied CO2 emissions in trade. As the McKerlie et al. (2006) suggest that all parties with a role in designing, selling or using a product are responsible for minimizing the environmental impact of the product over its life. A significant amount of emissions originates and flows between regions in the goods that are traded between provinces, the embodied emissions in trade. Embodied emissions is a kind of concept used to examine the extent to which emissions are embodied in the interregional trade of goods and services (Wiedmann, 2008). If a country has to import a large amount of intermediate inputs to assemble its export products, the value added is much less than the gross exports value. In the end, it is the domestic emissions content in trade. In a hypothetical case, If cars are produced in two regions Guangdong and Shanghai. Guangdong sells cars to consumers in itself and in Yunnan. Shanghaiâ€™s car industry sells on its domestic market and to export. Steel was produced in Yunnan then the emissions that went into producing that steel is typically attributed Yunnan. Perhaps a better way of accounting for the emissions is to attribute it to the province in which the car itself is consumed, at the source of demand, rather than that of supply. Therefore, how to estimate the embodied emissions in interregional trade is vertical to measure the domestic value chains and trade patterns.

In this paper, we outline two perspectives on the CO2 emissions content of interregional trade. We distinguish two perspectives: the bilateral trade perspective (BT) or direct trade flow (DTF) perspective, and the multi-lateral trade perspective (MT) or global value chain (GVC) perspective. We found that the BT perspective is useful to analyse the domestic embodied emissions content of exports or outflows. The MT perspective is useful for tracing the carbon footprints and the development of global value chains.

Results

First, there are three key trading blocks. The Central Region is the main embodied emissions exporter, with significant flows to the East and North Coasts, while the Southwest Region is the main supplier of embodied emissions to the South Coast provinces. A smaller trading bock exists in the north between the interior Northwest Region and the Northern Municipalities and Northeast. These distinct groupings reflect the regional characterization of internal trade within China, due to the limited transport infrastructure linking the country, combined with the distances involved.

Second, the bialateral perspectives require a split of the exports by region of destination but still do not require a multi-regional input-output table. To analyze the new trade patterns, we decompose emissions into tree components, a multi-regional input-output table is needed and some double-accounting pitfalls should be avoided.

Conclusions

We highlighted two perspectives on the CO2 emissions content of trade. Since both perspectives as generated in a region to trading partners and to itself, it is vertical that the input output data used to calculate the BT and MT contents accurately reflect domestic embodied emissions and their division over industries and regions. The MT perspective is useful when you want to know how much various regions contribute to the emissions of a particular product, like a car produced in China as it allows tracing the embodied emissions in all stages of production.