

## **Making “dirty money” out of exports: Estimating value-added and pollution exports in China**

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Author: Wencheng ZHANG

Co-Authors: Rui WEI

As the world’s largest exporting country, China is also one of the largest air pollutant emissions emitters in the world. Exports contribute both to income creation and environmental degradation in China. However, rare studies explore both of them in a consistent framework. In the present paper, we analyzed simultaneously the economic benefit and environmental burden of exports in China using a global input-output model based on World Input-Output Database (WIOD). We compare China’s environmental burdens of exports with those of the other major economies in multiple aspects. Particularly, we analyze the environmental efficiency gaps between China and the other countries using structural decomposition technique. In this paper, the economic benefit is measured by the value-added exports which are income (wage and capital return) created in the export production, while the environmental burden is measured by the emissions exports of 8 types of air pollutants which are generated by China’s export production.

The results show that value-added exports in China increased significantly during 1995-2009. The share of value-added exports in Chinese GDP increased from 16.8% to 32.3% in this period, indicating that exports are of great importance for the income creation in China. Meanwhile, remarkable emissions were generated by export production in China. Emissions exports of CO<sub>2</sub> and NO<sub>x</sub> increased by 232% and 211%, respectively, during 1995-2009. For the other pollutants, emissions exports also increased by over 100%. Shares of emissions exports in total emissions from production of China also rose up greatly. In 2009, emissions exports accounted 22%~35% of total emissions from production in China.

By the comparison across countries, we find that China’s share of value-added exports in the global value-added trade reached 10.4% in 2007 which was the second largest in the world. However, the global share of emissions exports of China was significantly greater than that of the other countries and much greater than the share of value-added exports for most types of pollutants. While the emission intensities of exports (PIE, ratio of emissions exports to value-added exports) in China were continuously declining for all pollutants in study period, they were still significantly greater than those of developed countries and of some developing countries.

We use structural decomposition technique to analyze the factors determining the PIE gaps between China and selected countries. Although there are some varieties in results for different air pollutants or different country pairs, the decomposition analysis shows that the gaps in PIE are mainly caused by the differences in emissions intensity, input structure and value-added ratio between China and selected economies. On the contrary, differences in export structures generally narrowed the gaps in PIE between China and selected economies. In other words, the relatively higher PIE of China mainly results from its dirtier technology reflected by the higher direct emissions intensity of production and more emissions-intensive input structure, while relatively cleaner export structure of China generally reduces the gap in PIE between China and selected countries.