Revealing the hidden health costs embodied in Chinese exports

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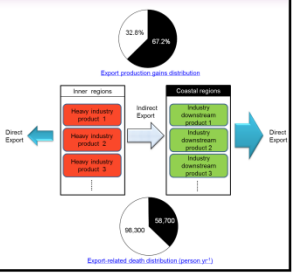
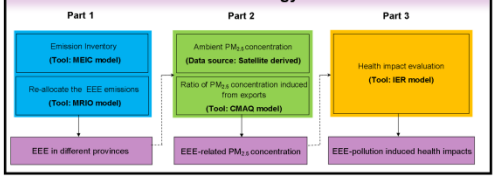
Main findings

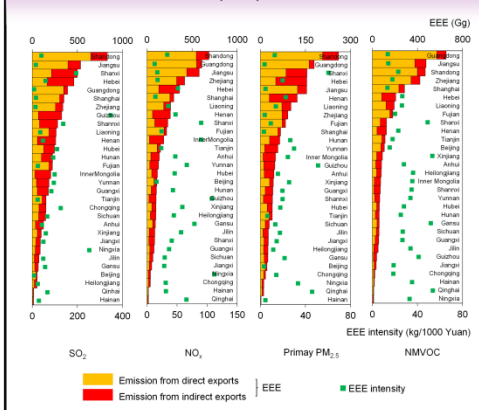
1. Export-related emissions elevated the annual mean population weighted $PM_{2.5}$ by 8.3 μg/m^3 (15% of the total).
2. The elevated $PM_{2.5}$ concentration from export induced 157,000 deaths in 2007, accounting for 12% of the total mortality attributable to $PM_{2.5}$-related air pollution. This is the first quantification of health consequences from air pollution related to Chinese exports.
3. Compared to the eastern coastal provinces, the inner regions experience much larger export-related health losses relative to their economic production gains, owing to huge inter-regional disparities in export structures and technology levels.
4. A shift away from emission-intensive production structure and export patterns, especially in inner regions, could significantly help improve national exports while alleviating the inter-regional cost-benefit inequality. The proposed policy recommendations, based on health burden, economic production gains and emission analysis, would be helpful to develop more sustainable and effective national and regional export strategies.



Methodology



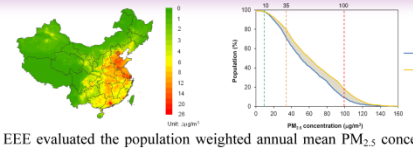
Emission embodied in Chinese exports (EEE)



—Emission from direct exports: Resulting from the production of goods and services shipped directly out of the country.

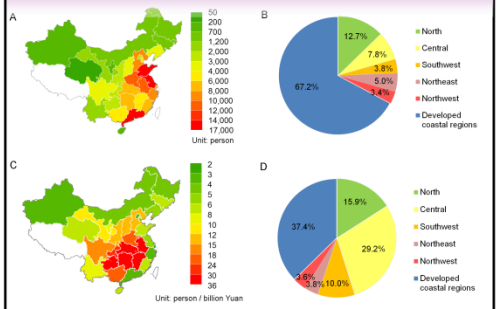
—Emission from indirect exports: Arising from goods and services production that is used to support the direct export in the same and/or different regions.

EEE induced $PM_{2.5}$ pollution



1. EEE evaluated the population weighted annual mean $PM_{2.5}$ concentration from 56 to 64 μg/m^3 in 2007.
2. More than 1.1 billion people, or 90% of China's total population, are affected by pollution attributable to EEE.
3. The fraction of people living in areas with annual average $PM_{2.5}$ concentrations over 35 μg/m^3 increased by 10%.

Export induced mortality and distribution



1. Deaths triggered by EEE-related pollution occurred throughout the country, with eastern and southeastern regions suffering the most.
2. The coastal areas suffered 37% (57,000) of all deaths and obtained 67% of export-related production gains from Chinese exports; In contrast, the central regions obtained a small proportion of overall export-related production gains, 8%, but accounted for nearly 30% of all deaths (47,000).
3. Considerable production gains attained in eastern developed regions through exports are at the expense of health conditions in less-developed central and western regions and that reveal the extreme regional inequality.

Emission → **Air quality** → **Health impacts** ← **Exports**

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