Does consistency with national accounts matter for calculating carbon footprints with global multi-regional input-output tables? A structural decomposition approach for comparing results for Belgium

Topic: (1.6) Environmental IO Modelling (1)
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This paper consists of a comparison of Belgium's consumption-based CO2 emissions or carbon footprint over the years 1995-2007 calculated using three different underlying datasets:
1) National IO-tables: this implies making the assumption that the technology for producing imports, i.e. foreign technology, is identical to domestic technology (emissions embodied in trade approach).
2) Global multi-regional input-output tables from WIOD: these tables provide a much better estimate of the technology used for producing imports but data for Belgium do not fully respect the country's national accounts.
3) Re-estimated global multi-regional input-output tables from WIOD where data for Belgium are kept consistent with Belgian national accounts (WIODBEL, estimation along the lines of Eden et al., ESR 2015): this dataset combines the advantages of the two former, providing a more realistic picture of foreign technology while also respecting Belgian national accounts.
Our results show significant differences in footprints. The third dataset yields our preferred results for Belgium's carbon footprint. Based on global multiregional input-output tables (WIOD and WIODBEL), Belgium's carbon footprint is significantly higher than its production-based emissions, while it is lower based on national IO-tables. The WIODBEL carbon footprint for Belgium, i.e. the one based on the re-estimated global multiregional input-output tables that are consistent with the Belgian national accounts, is initially higher than the WIOD carbon footprint, i.e. the one calculated with the published data from WIOD. But its growth is slower so that from 2002 onwards the WIOD carbon footprint exceeds the WIODBEL carbon footprint. We then push things one step further and use structural decomposition analysis to determine factors that contribute to the difference with respect to the carbon footprint results obtained based on the latter two datasets. These factors comprise differences in emission data, differences in input-output data for Belgium (trade and domestic production structure) and differences in foreign technology.