Consumption based emission accounts - recommended approaches for modelling energy and emissions embodied in trade

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Increasing focus is being placed on consumption based accounting of greenhouse gas emissions, or carbon footprints. As policy is being developed alongside these measures, there is a clear need for robustness in the footprint accounts and calculations. Whilst consumption based accounting needs information on supply chains and consumption, such as through multi-regional input-output (MRIO) models, a critical area to get consistency between models is on the emissions accounts themselves.

Due to construction challenges in MRIO, incomplete data, and lack of resources in following relevant accounting standards, estimation steps are required and accounting practices are not uniform, thus leading to the inconsistency among MRIO databases, in particular for carbon footprint results. Recent work has shown that of the main components of environmentally extended MRIO databases – i.e. the inter-industry flow matrix, the final demand account, and the environmental stressor account – it is the latter, the environmental accounts, which are the single biggest contributor to variance across the models.

In this work, the goal is to exemplify the principal approaches in establishing energy use and greenhouse gas accounts in MRIO models, to establish the impact on consumption based accounts by following differing approaches (especially focussing on the impact of different allocation methods concerning the allocation to residents such as international transport and purchases by residents abroad and allocation between industries), and to estimate the level of harmonisation in consumption based accounts that can be achieved through harmonisation of approaches. Furthermore, we present a harmonized approach to create environmental satellite accounts across different MRIO databases.