Sustainability of Spanish householdsâ€™ consumption: A Miyazawa's extended input-output model

Topic: Input-Output Analysis: Sustainable Production and Consumption Policies - X
Author: Pilar Osorio
Co-Authors: Maria Angeles Cadarso, Maria A. Tobarra-Gomez

Climate change mitigation is one of the major challenges to be addressed during this decade worldwide. Tackling it will require a rapid response and a full understanding of demand-side drivers. According to the 2030 Agenda of the United Nations and the European Green Pact of the European Union, analysing the sustainability of household consumption is a priority objective to fulfill the target set in the Paris Agreement. In fact, the latest IPCC report (IPCC, 2022) estimates that changes in household consumption patterns can have a mitigation potential of 40-70%.

To evaluate household consumption sustainability, multiregional input-output models are a useful tool widely used that quantifies all the emissions embedded in the production process through the global value chains, due to an increment in final demand. However, Leontiefâ€™s basic model has a limited scope since it only contains output multipliers and maintains all final demand as exogenous. As an improvement, Miyazawa (1976) introduced some novelties, closing the model by understanding households as a decision-making unit and introducing it through consumption coefficients and labour income coefficients, which are reflected in income multipliers.

This close model provides a deeply understand the nexus production-consumption and the total effects of an increase in final demand (other than consumption) through the global value chains by sector and regions (direct and indirect effects) and induced consumption activities (Miller and Blair (2009), Temursho and Hewings (2021)). Furthermore, this overview of the complex nexus output-income should be complemented with an environmental dimension. Output production has certain emissions associated, and, at the same time, output implies the generation of income and more additional emissions are generated due to the consumption of that income.

In this paper, we aim to evaluate consumption sustainability in Spanish households by using the Miyazawa multipliers and extensions in an environmentally extended multiregional input-output model for the first time to our knowledge. As contributions, this research allows us to analyse the initial emissions generated by an increase in the autonomous demand (measured in CO2), and the additional emissions generated due to the consumption of income by regions and sectors. Following Miyazawaâ€™s model, the multiregional enlarged emissions multiplier, the interregional income multiplier, and the multisectoral income multipliers are calculated, taking only Spain as the origin region. To this end, we use OECD Inter-Country Input-Output (OECD, 2021a) Table for 2018, and additional OECD data of carbon emissions (OECD, 2021b) and compensation of employees (OECD, 2021c), estimating missing information for the ROW region. The model is run for 67 regions and 45 industries. However, results are presented aggregated into 7 regions (Spain, Rest of Europe, China, NAFTA â€“which contains Canada, EEUU, Mexicoâ€“, BRIIAT â€“which contains Brazil, Russia, India, Indonesia, Australia and Turkeyâ€“ , East Asia â€“which contains Japan, Korea, Laos, Malasya, Myanmar, Phillippines, Singapore, Thailand, Vietnamâ€“ and Rest of the World) and 16 sectors.

In comparison to Leontiefâ€™s basic model, this model enables a more comprehensive results of sectoral carbon responsibilities, including induced consumption, mapping out the changes in emissions responsibility when the nexus production-consumption is considered. In addition, it allows us to analyse how emissions vary due to changes in the distribution of household consumption or changes in the matrix of consumption coefficients.

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