Regional CO2 EmissÃµes: a systemic temporal analysis

Topic:
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The interest of this article lies in the rise of global discussions that have been intensifying countries' decarbonization commitments, mainly through the adoption of production systems that are capable of stimulating sustainable practices and mitigating environmental impacts, especially greenhouse gas emissions. Brazil, in turn, attracts global attention when it comes to these aspects, particularly due to its vast regional and environmental diversity, potential for agricultural production and insertion in international trade. Therefore, this article aims to address the topic through a model that allows innovating discussions regarding the spread of emissions in a systemic, sectoral, and spatial context for Brazil. In other words, understand the degree of the production chain in terms of economic links and emissions. To this end, the inter-regional input-output matrices were used with a spatial disaggregation for 27 units of the Federation for the years 2011 and 2015 made available by the Center for Regional and Urban Economy of the University of SÃ£o Paulo (NEREUS). Data relating to emissions are found in the Greenhouse Gas Emissions and Removals Estimation System (SEEG), but at a regional and sectoral level the data were provided by NEREUS. The empirical strategy used consists of the combination of systemic analysis methods. The first step was, through an adaptation of the Rasmussen and Hirschman indicators, to obtain a classification of the Federation units in terms of their importance both in economic terms and in terms of CO2 emissions. The second step was to build a typology of the 27 units of the Federation based on both the economic indicator and the emissions indicator. Finally, the third step was the implementation of the Structural Decomposition Analysis (SDA), based on the typology constructed in the second step, to investigate the main driving forces behind the variation in CO2 emissions (e.g. intensity effect, final demand effect, disaggregated for households. The main results reveal that agricultural sector is identified as the main source of emissions in Brazil, particularly in states where these sectors have a low participation in the value added of the production chain. Another contribution lies in the spatial analysis, as regions with biomes important for the ecosystem, such as the Amazon, is surrounded by states with higher levels of emissions. Finally, the increase in CO2 emissions is mainly incorporated into commodity exports and is negatively correlated with technological progress. and exports and technological effect)