CO2 Mitigation through Similarity Analysis of Production Technologies and Lifestyles of Nations

Topic: Regional input-output modeling II (Chair: Vishnu Prabhu, Gokhale Institute of Politics and Economics)
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ã€ã€ã€To achieve a long-term temperature goal in the Paris Agreement, countries need to efficiently change production technologies and lifestyles toward building a low-carbon society. However, since the production technologies and lifestyles differ from country to country, it is necessary for the government to set a possible CO2 reduction target for 2030 through effective policies implemented by benchmark countries.

ã€ã€ã€We use the EXIOBASE3 multiregional input-output table of 44 countries and regions and calculate a similarity matrix for technical coefficients between countries as well as a similarity matrix for household consumption coefficients between countries.

ã€ã€ã€The Ward method as a hierarchical clustering approach is applied to the similarity matrices for production technology and consumption.

ã€ã€ã€From the results, we find that the countries are classified into several clusters including (i) developed countries including G7 countries, (ii) developing countries (e.g., the BRICS), (iii) countries with higher consumptions of certain consumption items such as health and social work services and real estate services (e.g., the US and Switzerland), and (iv) countries where the item of hotel and restaurant services accounts for a larger share of household consumption (e.g., Spain and Austria).

ã€ã€ã€We further investigate household carbon footprints for each group and find that there exists a significant gap in the average carbon footprints of countries that belong to the cluster. We suggest that a country can reduce CO2 emissions through learning from the benchmark countries with similar production technologies and lifestyles founded in this study.