

論文の内容の要旨

論文題目 Quantification of regional carbon dioxide emissions from production and consumption perspective

(生産と消費の観点からの地域の二酸化炭素排出量の定量化)

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Burning fossil fuels such as coal, crude oil, and natural gas generates considerable CO₂, which accounts for the majority of greenhouse gas emissions. Anthropogenic activities release carbon emission in both production and consumption stages. The estimation method can then be divided into production and consumption-based, respectively. But the debates remain on who should be blamed for the emission since the emission accounting methods may generate totally different estimation results. To discuss the question, this research takes as Japan as a study area and evaluates the carbon footprint embodied in regional activities by both production and consumption accounting methods.

In the first part, the production-based accounting is applied to quantify regional carbon emission. Then the decomposition method is used to analyze the influential factors that change before and after the year of the earthquake. The regional energy and emission structure are both analyzed and compared. However, the limitations of production-based accounting are also revealed based on this case study. The result comes to a demonstration of consumption-based accounting's advantage by revealing the emission embodied in the sectoral transaction. To further explore this advantage, this study uses Tokyo multi-regional input-output table to uncover the urban emission responsibility and its household emission features by month. However, although the consumption-based accounting excels in revealing emission embodied in consumption-behaviors, its application always limited by the data availability such as unavailable or undesirable input-output tables. Given by this, the result provides the alternative allocation priority to those areas that input-output data is not available while using consumption-based accounting. Finally, this research gives out an overall discussion of two accounting methods and its feasibility in the current accounting system.

To conclude, this research not only compares the different estimation generated by production and consumption-based accounting, both the advantage and limitations of each accounting method are demonstrated by four parts of empirical studies. The results are discussed in detail, and the policy implications of each section are given out.