Multi-region comparisons of energy performance: The structural decomposition analysis approach

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Structural decomposition analysis (SDA) is a popular tool for studying changes in energy consumption over time in a country or region. It has advantage in accounting for indirect effect under extended input-output (I-O) framework. This specific application of SDA, which may be called temporal decomposition analysis, has been extended by researchers to study variations in energy consumption between countries or regions, i.e. spatial decomposition analysis. In I-O based spatial decomposition analysis, the main objective is often to understand the relative contributions of final demand, Leontief structure and energy efficiency in explaining differences in total energy consumption between two countries or regions. We review the literature of spatial decomposition analysis, investigate the methodology issues and propose a spatial decomposition analysis framework for multi-region comparisons. A case study in which 30 countries in China are compared and ranked on their performance in energy consumption is presented.