

Global Productive Efficiency from a Input-Output framework.

Topic: Productivity and efficiency analysis II

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The main goal of this paper is to build an index that quantifies the global efficiency level of a country's economic system, identifying those elements of its productive structure on which the efficiency depends. For this aim, we apply a methodology based on the Takayama's dynamic model and the concept of largest real eigenvalue of a real square matrix (Perron-Frobenius Theorem) which, in this case, is the technical coefficients matrix. Starting from that, we propose a global efficiency index and analyze the eigenvector associated to the largest eigenvalue, in order to identify the patterns of sectoral specialization that lead to a given global efficiency level. Also, we applied a sensitivity analysis in order to map the transactions between sectors (e. g., technical coefficients) which are more relevant for increasing the efficiency since a change in their magnitudes involves major variations in the efficiency index. This methodology is applied to the case of the productive structure of several European countries. The global productive efficiency index provides four groups of countries with a different degree of global efficiency. Further, we find out that the productive sectors which support a gain of efficiency are Business, Transport and Storage, Wholesale and Retail Trade, Financing Activities, Chemistry, Basic Metals, Mining and Quarrying, and Electricity. Important specific transactions between sectors are also provided from the sensitivity analysis.