Analyzing the Gross Output Change of Energy Sector Industry in Indonesia between 1990 and 2005 by Decomposition Analysis

Ubaidillah Zuhdi
(Tokyo University of Science, Japan)
Shunsuke Mori
(Tokyo University of Science, Japan)

I. Overview

In recent years, contribution of energy on human life is very significant. Almost every aspect on human life needs energy. In other words, in recent years, human depends on energy in order to continue their life. Based on that, it can be said that study about energy sector industry, as producer and distributor of energy, as well as energy itself, is needed considering the rapid changes in the economic structure. The purpose of this study is to analyze the change of gross output of energy sector industries in Indonesia from 1990 through 2005 based on the Input-Output tables to deal with the above structural changes explicitly (Shikanwita, et.al., 2004) (Liu,et.al.2010) (Miller, et.al., 2009). Energy sector industries discussed in this study are (1) coal, (2) crude oil, (3) natural gas and geothermal, (4) tin ore, (5) nickel ore, (6) bauxite ore, (7) copper ore, (8) gold and silver ore, (9) other mining, (10) basic chemical except fertilizer, (11) other chemical products, (12) petroleum refineries products, (13) liquefied of natural gas, (14) other non-ferrous products, (15) basic iron and steel, (16) basic iron and steel products, (17) non-ferrous basic metal, (18) non-ferrous basic metal products, (19) structural metal products, (20) other metal products, and (21) electricity and gas.

II. Methods

The structure changes analysis of the input-output tables, known as the "decomposition analysis", is used in this study. The derivation of structural decomposition analysis is shown in followings:

$$X = AX + D + E - M \tag{1}$$

X, D, E, and M are vectors of gross output, domestic final demand, exports, and imports, respectively. A is a matrix of technical coefficients. This method decomposes the dynamic change of gross output ΔX into the changes of $\Delta D, \Delta E, \Delta M$ and ΔA, calculating the differentiation of equation (1). That is,

$$\Delta X = DD + EE + IS + IO \quad (2)$$

where ΔX , DD, EE, IS, and IO are the change in gross outputs, effect of the expansion of domestic final demand, effect of export expansion, effect of the changes in import ratios (domestic supply ratios) or import substitution, and effect of the changes in technical coefficient, respectively (Akita & Chu, 2008). Those factors are used into the input-output tables of Indonesia in 1990, 1995, and 2005. The tentative conclusions show that the sector which had the highest change in gross output was electricity and gas between 1990 and 1995 while that between 1995 and 2005 appeared in crude oil sector industry.

III. Expected Results

The expected result from this study is to know the pattern of gross output change of energy sector industries in Indonesia from 1990 through 2005. In specific terms, the expected result from this study is to know the Indonesia energy sector industry which had the positive and negative change in gross output between 1990 and 2005. The international comparison in energy sector industries, such as Japan and Indonesia, is also expected to be discussed from this study.

IV. References

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