

Drivers of Energy-Related CO2 Emission Changes in Indonesia: Structural Decomposition Analysis

Topic: Thematic IO analysis: Energy and Environment

Author: Djoni Hartono

Co-Authors: Muhammad Handry Imansyah, Sasmita Hastri Hastuti, Titi Muswati Putranti

Drivers of Energy-Related CO2 Emission Changes in Indonesia:
Structural Decomposition Analysis

Sasmita Hastri Hastuti¹, Djoni Hartono², Titi Putranti³, Muhammad Handry Imansyah⁴

¹Faculty of Economics and Business, Universitas Indonesia, Depok, Indonesia

²Research Cluster of Regional Economic Modeling and Energy Analysis,
Department of Economics, Universitas Indonesia, Depok, Indonesia

³Faculty of Administrative Science, Universitas Indonesia, Depok, Indonesia

⁴Faculty of Economics and Business, Lambung Mangkurat University, Banjarmasin, Indonesia

Abstract

This study aims to decompose CO2 emission changes between medium run (1990-1995) and long run (1990-2010) in order to identify main drivers of emission changes in sectorial level. Using energy input-output and input-output table, emission changes are decomposed into six factors: energy intensity, carbonization factor, technology, structural demand, consumption pattern effect and scale effect. This model will allow a country to identify the effects of energy consumption, energy mix and production efficiency as direct sources of emission without ignoring their link to the economic structure and the accretion of final demand. This research is the first attempt in decomposing CO2 emission changes in multi sectors in Indonesia due to the lack of literatures on energy related emission changes in Indonesia. This study found that "electricity, water and gas", "construction" and "mining" have become major drivers rising CO2 emission where the accretion of final demand as the main driving factor. Meanwhile, the increased energy intensity causes a considerable impact on emissions in the long run; while technology is a potential factor to decrease emissions in the long run. This study also found that the changes of demand structure on the energy-intensive sectors especially in exports, as well as the increase of demand on "construction" sector in the capital expenditure contribute positively to long-term emissions.

Keywords: Structural Decomposition Analysis, Energy Input-output, Emission Growth, Energy Intensity