

Tracing and Quantifying Influences of Fossil Fuels in Thailand's Economic Structure Using Multiplier and Structural Path Analysis

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Objective

Thailand has pledged the Nationally Appropriate Mitigation Action (NAMA), which includes the sector-specific reduction of Greenhouse Gas (GHG) emission. For this scheme, the insight of economic structure, especially the roles of high GHG emitting sectors within the economy, is among important fundamentals. Hence, this study aims at examining how adjustments originated from high GHG emitting activities propagate throughout the economy.

Methodology

This study uses official input-output tables of 1990, 1995, 2000, 2005 and 2010 which are the most updated official data. The computation of Leontief backward and forward multipliers is conducted to examine each production activity's propagation magnitude to other sectors. In addition, Structural Path Analysis (SPA) is applied to further quantify the degree of economic linkages of high GHG emitting sectors along their supply chains.

Main findings

Interestingly, the multiplier analysis shows that the group of sectors having the highest values of backward and forward multipliers has been unchanged since 1990, and the refinery activity has been among these sectors having the highest forward multipliers. This indicates the significant role of fossil-based energy in Thai economy since 1990. The result from SPA also illustrates and quantifies that refinery is among the most influential sectors of origins, functioning as the starting point of many supply chains. These results indicate two important facts for developing the national GHG reduction plan. Firstly, the fossil fuel has been the backbone of Thailand's economic structure since 1990. Therefore, the action to alter the fossil-based production network has to be very influential to reshape this persisting structure. Secondly, the refinery sector, considered as one of main GHG emitters, is the major upstream activity playing a very significant role in supplying most important paths of production chains. Hence, the adjustment of the refinery sector will inevitably propagate throughout all connecting supply chains and subsequently incur the high abatement cost of GHG reduction.