

Mapping global value chains of low carbon technologies diffusion from OECD to ASEAN countries using input-output analysis

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In recent years, global value chains and low carbon technologies have been discussed intensively in international discussion on trade and climate change. Globalization had strengthened the internationally fragmented of global production, trade and investment among countries. Simultaneously, the 2015 COP21 Paris Agreement and the 9th goal of the 2030 SDGs mention the important roles of low carbon technologies innovation and diffusion from developed countries to support the low carbon economy of developing countries. Japan, US, UK, Germany and France are among OECD countries who are actively promoting the low carbon technologies diffusion to developing countries through several channels (e.g. trade, FDI, ODA). In recent years, ASEAN countries provide the promising market demands for low carbon technologies diffusion from OECD countries. The high economic growth, emissions reduction targets, energy sector reforms, and ASEAN Economic Community (AEC) are four major factors that attract OECD countries to shift their low carbon technologies diffusion to ASEAN countries.

Against this background, this study aims to map the positions of selected OECD (Japan, US, UK, Germany, and France) and ASEAN countries in global value chains of low carbon technologies. This study tries to answer three research questions as follows. First, what are the value-added shares of low carbon technologies diffusion from selected OECD countries to ASEAN countries during the period 2005 to 2014? Second, how many production stages of global value chains of low carbon technologies in selected OECD countries during period 2005 to 2014? Third, what are positions and comparative advantages of each selected OECD and ASEAN countries in global value chains of low carbon technologies during the period 2005 to 2014?

Several recent studies in global value chains have utilized input-output analysis using OECD/IO table, IDE JETRO/AIOTs, GTAP database, and WIOD (e.g. Yamano et al. (2010); Backer et al. (2012); Inomata (2012); Meng et al. (2012); Timmer (2012); Backer et al. (2013); Koopman et al. (2014); Timmer et al. (2014) and Los et al. (2015)). This study applies the similar methods used in the previous studies (trade in value added indicators) using the time series of OECD-IO tables (released on June 2, 2015) which cover years of 2005, 2008, 2009, 2010 and 2011. This study focuses on selected 23 low carbon technologies for the cases of selected OECD countries (Japan, US, UK, Germany, France, and Korea) and ASEAN countries.

Since the most-disaggregated available OECD IO table covers only 34 industries classifications based on ISIC Rev.3, this study single-outs the selected 23 low carbon technologies from its parent sectors using the calculated disaggregation ratios. To do so, this study firstly collect the bilateral trade data of selected 23 low carbon technologies from selected OECD and ASEAN countries using UNCOMTRADE Data from year 2005 to 2014. Secondly, as UNCOMTRADE data uses HS codes, this study corresponds the UN COMTRADE data of low carbon technologies with bilateral trade matrix of selected low carbon technologies with the OECD-IO table which uses ISIC classification. Thirdly, this study calculates the disaggregation ratios of each selected 23 low carbon technologies to disaggregate it from each parent sectors. Fourthly, this study applies the value added-in trade methods to conduct global value chains analysis of selected low carbon technologies. The input-output analysis in this study measures the various indexes represent the participation, length, distances, and comparative advantages of each selected OECD countries in global value chain of low carbon technologies diffusion to ASEAN Countries. The results of this study can assist policy makers in selected OECD countries to draw better supporting policies (trade and investment) in gaining better benefits of global value chains as well as to seek possible further co-operations among selected OECD countries for low carbon technologies diffusion to ASEAN countries.

The originalities of this study are two folds. First, this study combines two recent issues (GVCs-IO

analysis) and low carbon technologies into one possible IO model by disaggregating the selected 23 low carbon technologies from the OECD-IO table. Second, this study tries to map and measure the position and comparative advantages of each selected OECD countries in global value chain of low carbon technologies diffusion to ASEAN countries.

Keywords: low carbon technologies diffusion, OECD, ASEAN, comparative advantage, global value chains-IO analysis