

MEASURING THE IMPACT OF CLIMATE CHANGE MITIGATION ON THE OPEC ECONOMIES

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ABSTRACT

➤ Study Background

The Organisation of Petroleum Exporting Countries (OPEC) has been at the centre of the global energy debate for almost four decades. Since its formation, OPEC has become a major force economically as every economy seemingly depends on oil and gas for its primary energy consumption. OPEC has among other issues determined the production, supply and pricing of their energy exports especially oil and gas. However, with the advent of climate change, environmental and fossil energy supply concerns, it is no longer in doubt that the global demand for oil and gas products would be in decline in the foreseeable future.

The future decline in global oil and gas demand with emphasis on the major importing OECD countries as a response to climate change mitigation policies makes the concept of energy demand security inevitable in the literature. Previously, the literature has focused on energy supply security. While energy supply security is defined in the literature as “the availability of energy supply at affordable prices” we would define energy demand security as “the availability of energy demand or export at competitive prices”. Similarly, the external energy demand security can be explained as the availability of global market for energy exports.

In order to develop policies to remedy the expected impact of the global decline of OPEC energy exports, there is need to understand the nature and size of the external energy demand risks facing the respective OPEC economies. Therefore this research focuses on the estimation of the exposure of the OPEC economies to the expected energy exports demand risks.

➤ Research Framework & Methodology

This study intends to address the external demand risks associated with oil and gas importers only as the domestic demand of these OPEC economies is low and majorly subsidised. The major importing countries acting as monopsonists may determine the demand quantity and also influence prices for either economic or political reasons or their climate change mitigation policy. In assessing the vulnerability of the OPEC economies to the expected decline in their energy exports vis-à-vis government earnings, the study would construct a risky external energy demand (REED) index based on the factors that affect energy exporting economies to evaluate the associated risks. The index would combine measures of net energy exports dependency (X), monopsony risk (M), transaction cost risk (D), energy fungibility (F) and the economic importance (E) of both oil and gas to the different countries energy bundle.

$$REED = \sum(X)*M*D*E* (100-F/100)$$

The higher the countries index the more risky the external energy demand security. The index is disaggregated by considering the two most significant energy export commodities for the OPEC member states – oil and gas. The study also ranks the respective OPEC countries according to the index and compares the results to existing or related index in the literature. The impact of the respective countries risks to the entire OPEC risk exposure is also be estimated. This is the contribution to the OPEC risk exposure (CORE). Theoretically, the

country with more risk exposure individually would contribute more to the group's total risk exposure.

$CORE = REED * S / \sum (REED * S)$, where S is the share of the individual country's share in total OPEC energy exports.

➤ **Data**

The data for the study is collated from the OPEC exports data, IEA and other international trade data among others.

➤ **Research Methodology Description**

The novel definition of the concept of external energy demand security in this study points to some characteristic features that would be utilised to estimate the index. The Risky External Energy Demand (REED) index would be designed in line with existing economic measurement index to measure the present and potential risks to the OPEC energy exports. The measure of energy export dependence forms the block for this index. The energy export dependence is calculated as the ratio of the value of the net positive export to the total export. The diversification level of the export is also considered in designing the REED index. The diversity of the export basket would rely on the Herfindahl-Hirschman approach which is the sum of squares of each importer's share in the total exports. The Herfindahl-Hirschman model which is used for market concentration analysis would be reliable because it emphasises more on the larger market concentration which would satisfy the assumption of monopsony effect (i.e., large importers affect the energy demand security equation more, all things being equal). Transaction costs would also be considered for this index using a transportation or infrastructural disruption analysis. Other factors that would be considered in the index are the ease of substitutability (fungibility) among the energy export commodities and the economic importance of the different energy exports.

➤ **Impacts**

The study outcome would be a very useful policy resource for the OPEC member states as the world looks to rely more on non-fossil energy. The study would be relevant in analysing the response of these economies to the global climate change debate. It would also contribute to the policy position of the developing economies in the UNFCCC global CO2 emissions reduction deliberations/agreement. Finally, this study would also specifically contribute to the energy security and trade, OPEC and developing economies literature.