***Energy Security and Portfolio Diversification: GCC Exporters’ Perspective***

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## Overview

Energy security has long been one of the key elements of energy policy and national security. Initially, the concept of energy security was confined to ‘assuring sufficient energy supplies’ (Willrich 1976) reflecting the crucial role of energy supplies in the World Wars I and II and the aftermath of the energy crises in 1970s. In the following decades, especially after the oil price shock caused by the Gulf War, the economic aspects of energy security, primarily, the affordability of energy and the impact on the national welfare, became the focal points of the concept.

A number of recent studies suggest further expansion of the issues that should be addressed within the energy security paradigm. These include infrastructure, environmental and societal impacts, energy efficiency and infrastructure among others. However, the security of physical supply and price affordability remain the main pillars of energy security as evident from the definitions of this concept adapted by the international organizations, such as the International Energy Agency, the United Nations and the European Union.

Inclusion of the exporters’ perspective broadens the scope of threats / risks traditionally attributed to the energy security concept. In line with the two major dimensions of energy security – security of physical supplies and economic (volume and price) dependability – energy security threats for exporters can be classified into two major categories: disruption of physical shipments and those inducing negative economic impact.

## Methods

We measure the physical ‘dependency’ indicators expressed in physical units, with data from the country’s energy balance.

The other group of energy demand security indicators focuses on a country’s exports portfolio and strategies. The Herfindahl-Hirschman Index (HHI) is a common measure of market concentration that is used to determine market competitiveness.

We assume that the diversification of an energy exports portfolio, in general, improves its risk profile. However, this improvement can come at a cost due increased overhead costs associated with a bigger pool of consumers and a lower share of the more profitable consumers in a more diversified portfolio.

A portfolio analysis method can be applied to estimate the efficient risk / reward frontiers for the exporter’s portfolios and to assess the balance between the major priorities of demand security – increasing exports volumes and increasing export prices.

This paper explores the growth-volatility and price-volatility dynamics in the structure of oil exports portfolios of the GCC economies: Kuwait, Oman, Qatar, Saudi Arabia and the UAE, with the exception of Bahrain, whose current oil imports structure doesn’t allow to build an efficient frontier of its oil exports portfolio. The suggested approach provides an innovative assessment tool for the two major pillars of energy security – security of supplies (demand) and adequate prices – and highlights the exporter’s perspective on these issues. It can be applied to assess the current composition of the energy exports portfolios, test the potential impacts of various market development scenarios and help developing relevant response (prevention) strategies.

To assess the trade-offs facing oil exporters we construct two efficient portfolio frontiers for the countries in focus with the following characteristics:

1 The oil export growth portfolio: The return variable is represented by the monthly growth rate in oil export volumes and variance is derived from the structural composition of the portfolio, based on the historical exports data from individual buyers. This portfolio represents the trade-off between high growth and concentration and lower risk through diversification.

2 The oil export price portfolio: In this portfolio, the return variable reflects the average monthly oil price received by an exporter. The portfolio variance is estimated based on fluctuations of the price paid by individual buyers and their respective shares in the total oil exports of a particular country. This portfolio represents the trade-off between concentrating on a few buyers that offer the best price terms and reducing the exporter’s risks through diversification.

These portfolios cover two major aspects of energy security from the exporter’s perspective: demand security and obtaining favorable price terms while minimizing the associated risks.

## Results

We estimate efficient frontiers for growth of crude oil export volumes, showing the trade-off between the monthly exports growth rate and associated risk, which is represented by the standard deviation of exports growth rate, for five GCC nations – Kuwait, Oman, Qatar, Saudi Arabia and the UAE.

The observed range of standard deviations of the 2018 export growth is broad: 0.047 for Saudi Arabia, 0.062 for Kuwait and 0.064 for the UEA to 0.1 for Qatar and 0.15 for Oman. Based on the risk profiles represented by the efficient frontier curves, we can identify different groups of oil exporters with similar characteristics.

We develop several scenarios to test how the oil exports portfolios of the GCC countries perform under various demand and transit shocks.First, we establish the baseline scenario – *Baseline 2018* – by identifying the countries’ positions on their efficient frontier curves that correspond to their respective average monthly oil exports data for the year 2018. Then, we test the short-term impacts of the sharp increase in Chinese oil imports. In the next scenario we assess the longer-term consequences of potential redistribution of global oil import flows by reducing the share of the US in the exports portfolios of the GCC countries (and redistributing it among the other importers). Finally, we test the portfolio resilience to the logistics shocks of the Malacca strait blockade.

## Conclusions

We were able to estimate efficient frontiers for growth of crude oil export volumes for five GCC nations – Kuwait, Oman, Qatar, Saudi Arabia and the UAE. We find significant diffrences in the level of risk ( variability) across countries associated with the growth rate of oil exports.

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