OIL CONSUMPTION OR OIL EXPORT: WHICH MAKES AN EQUILIBRIUM WITH ECONOMIC GROWTH AMONG THE MIDDLE EAST COUNTRIES?

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Overview

This study tests the long-run equilibrium and causal relationship between economic growth and oil consumption and between economic growth and oil exports in the Middle East countries which are the United Arab Emirates, Bahrain, Oman, Saudi Arabia, Kuwait, Iran, and Iraq. This study groups the Middle East countries and finds the implication for their energy conservation policy and oil production based on the empirical results. This study can be used as a fundamental research for a further study of economic growth in the Middle East or energy exporting countires.

Energy demand of the Middle East countires is forcasted to grow rapidly. Energy demand of the Middle East countries are expected to grow 1.9% per year from 2012 to 2040, while energy demand of the OECD countries are expected to grow slowly, 0.1% per year, in the same period(IEA, 2014). The Middle East contires start being interested in the relationship of their energy consumption and economic growth(Al-Iriani, 2006).

Meanwhile, most of the Middle East contries is the oil-producing and exporting country. The Middle East countries have accumulated the economic wealth by exporting their oil(IMF, 2013). However, their oil export is sluggish and the oil price keep low level in these days so it is also forecasted that the economy of the Middle East countires grows slowly(IMF, 2013). This means decreases in oil exports can be a hidrance for the Middle East countries' economic growth and this is a distinctive difference between the Middle East countries and oil importing countries. Thus, like a relationship between energy consumption and economic growth in industrialized countries, the relationship between oil exports and economic growth should be investigated.

Looking these matters, this study investigates the long-run and causal relationships between the economic growth and oil consumption and between economic growth and oil export of the Middle East countries. This paper only considers the oil consumption because many countires in the Middle East implement energy demand management especially by reducing the subsidies for oil products. This study conducts the Johansen cointegration tests and Granger causality tests based on the vector error correction models(VECM) and vector autoregressive(VAR) models. Finally, this study classifies the Middle East countires in three groups and discussed implications.

Methods

When two time series, X and Y, have unit roots and they are cointegrated, they can be expressed in VECM by the Granger's Representation Theorem as equation (1), (2), and (3).

$$\Delta Y_t = \alpha_3 + \Sigma \beta_{3,i} \Delta Y_{t-i} + \Sigma \gamma_{3,i} \Delta X_{t-i} + \delta_3 ECT_t + \varepsilon_{3,t} \tag{1}$$

$$\Delta X_t = \alpha_4 + \Sigma \beta_{4,i} \Delta Y_{t-i} + \Sigma \gamma_{4,i} \Delta X_{t-i} + \delta_4 ECT_t + \varepsilon_{4,t} \tag{2}$$

$$\text{Where } ECT_t = Y_t - \alpha_0 - \beta_0 X_t \tag{3}$$

Estimating the VECM, three types of causality can be tested. First, the short-run causality can be tested based on the set of coefficients for the differentiated variables ΔY and ΔX. Second, the long-run causality can be tesed based on the coefficient of *ECT* which means the error correction term, or the equilibrium error, in the differentiated equations. Third, the strong causality can be tested by conducting the joint test of the short-run and long-run tests. The strong causality says the strong evidence of the causality between two variables. If two time series, X and Y, are not cointegrated, they only can be expressed in VAR model for the differentiated variables ΔY and ΔX and the short-run causality test only can be conducted. This paper conducts cointegration tests and causality tests for each countires in the Middle East. Some studies investigated them by constructing panel data(Al-Iriani, 2006; Narayan and Popp, 2012) but the results cannot be interpreted considering idiosyncracy of each country as Squalli(2007) pointed out.

Results

The Middle East countries used in this paper are classified in three groups. The first group countries, including the United Arab Emirates, Bahrain, and Oman, have the long-run equilibrium only between their economic growth and oil consumption. These countries' ecocnomic growth has no causal relationship with oil exports. The second group countries, including Saudi Arabia, Iran, and Iraq, have the long-run equilibrium only between their economic growth and oil exports. These countries' economic growth has no causal relationship with oil consumption except for Saudi Arabia which have unidirectional causal relationship from oil consumption to economic growth. The third group only includes Kuwait and Kuwaiti economic growth has no equilibrium both with oil consumption and oil exports.

This classification can be explained by their proved oil reserves in some extent. Iran and Iraq in the second group, are the only countires whose average growth rate of proved oil reserves is larger than 1% in the period from 1990 to 2014. The other countries' growth rates are smaller than 1% and their proved oil reserves almost keep flat. However, Saudi Arabia in the second group has the largest proved reserve, even though its growth rate is 0.16% per year, which keeps 250 billions barrel while the second largest proved resrve in Iran is about 150 billions barrel in 2014. Thus, the country which enlarges their reserve or the country which have already large reserve, has long-run equilibrium in their economic growth and oil exports as being included in the second group. The fact that they have strongly fostered the oil industry based on their oil reserve, though they also have implemented the policy for industry diversification, supports this results.

In contrast, the countries which oil reserve grows very slowly have no equilibrium between economic growth and oil exports. Some of these countires which are the United Arab Emirates, Bahrain, and Oman in the first group have the long-run equilibrium between economic growth and oil consumption. They have strongly implemented the policy for industry diversification since they were aware of the limit of their oil reserve. Their policy and the results from industry diversification are highly acclaimed than other Middle East countries

Conclusions

The results of this study suggest that the oil exports in the Middle East countires cannot be a driving force for their economic growth and some countries have grown their economy by oil consumption. This difference can be explained by their physical circumstances, especially oil reserves and the following policy for industry diversification. In addition, the countries, Saudi Arabia, Iran, and Iraq, should make an investment to their oil industry not to suffer a setback of their oil exports. Also, the countries, the United Arab Emirates and Bahrain, should pay attention to their energy conservation policy not to interrupt their economic growth since these countries have causality from energy consumption to economic growth. This results and implications can be used for a further study which investigates the relationships among economic growth, energy consumption, and energy exports in energy exporting countries.

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