THE STRUCTURE OF THE LNG IMPORT PRICE IN THE NORTHEAST ASIA: CONSIDERING THE PRICE PREMIUM

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Overview

This study investigates the structure of the liquefied natural gas(hereafter, LNG) import price for Korea and Japan. Using the contract price formula which is a linear equation of benchmark crude, this study particularly considers the premium on the LNG importing price. The premium is important to investigate the structure of the LNG import price because most of the LNG volumes are traded as a long-term contract and there is no competitive market in the Northeast Asia. Thus, the importing price reflects the bargaining power of importers and exporters and it comes to the premium. The results of this study can shed light on incompetitive market condition in the Northeast Asia and can give some insight to market participants.

In this study, the price premium of LNG is defined as an unobserved amount which is unexplainable by the long-run contractual price level and freight rates in LNG importing price. This notion of price premium is different from Asian Premium which is usually measured by the differential between Arabian Light formula price for Asia and that for Western markets(Moon and Lee, 2003). Since major price formulas in LNG contracts are different for each continents, even in the same exporting country, estimating the price premium of LNG in that manner includes differences in properties of LNG price formulas. Thus, this study defines and estimates the premium on LNG importing price itself, not a relative premium.

Since the price premium can different for contracts, this study considers two import routes which are from Qatar to Korea and Japan and from Indonesia to Korea and Japan. The import price data for each import route is constructed from customs data and the price premium as well as price structure are estimated for each import route by Kalman filter. Since Kalman filter can estimate the price premium as a form of time-series, this study discusses the changes in the price premium according to the events, which are the appearance of Russia as a new supplier to Korea and Japan in April 2009 and Fukushima nuclear disaster in March 2011. This study also compares the price premium of Korea and that of Japan and suggests implications about strategies for importing LNG.

Methods

The contractual LNG prices for Asian contries are linked with crude oil price and the LNG price formula which is generally accepted in Korea and Japan can be expressed as equation (1) (Agerton, 2014),

$$P_{LNG} = a + b*P_{crude} \tag{1}$$

where P_{LNG} is the LNG price and P_{crude} is benchmark crude oil price. In this equation, the constant term a and the slope b are determined by the negotiation. The constant term a can be interpreted as a premium part determined and focused by negotiation(Do, 2005), or a term related to transportation cost(Seo, 2012). The price are generally adjusted quarterly by renegotiations between exporting countries and importing countries but the fundamental changes are limited(Stern, 2014). Thus, equation (1) can be re-written as equation (2) separating a into a constant term c, *freight rate*, and *premium* that cannot be observed. A freight rate can be excluded if P_{LNG} is measured as a FOB price but Asian LNG price usually measured as a CIF price so it should be included.

$$P_{LNG} = c+ b*P_{crude}+freight\ rate+premium \tag{2}$$

P_{LNG}, *freight rate*, and P_{crude} can be measured and recorded but the *premium* terms in equation (2) is difficult to be recorded and measured though the *premium* is important variables in reality. Therefore, a state-space model, which is widely used in macroeconomics, can be constructed based on equation (2).

$$P_{LNG,t} = c+ b*P_{crude,t}+freight\ rate_t+premium_t+e_t \tag{3}$$

$$premium_{t+1}= \gamma*premium_t +v_{t+1} \tag{4}$$

Equation (3) is observation equation and equation (4) is state equation. By using Kalman filter, this state-space model can be estimated and the estimated price premium in LNG importing price can be obtained in time series form. Estimated c and b can be interpreted as the average long-run contractual price structure considering rigidity as Stern(2014) said. If there is no price premium in the imported LNG, $premium_t$ will be estimated almost in zero.

Results

The estimated price premiums on the LNG importing price for Korea and Japan are shown in Figure 1. The appearance of Russia as a new supplier in April 2009 means increasing in competition of supplier side. The average premium on the LNG importing price for Korea from Indonesia decreased after the event and this is an expected result. However, that for Japan from Qatar increased. This may be due to the rigidity of long-term contracts. Thus, appearances of new suppliers do not always mean that importing countries are beneficial.

After the Fukushima nuclear disaster in March 2011, the average premium for both Korea and Japan from Indonesia increased due to the unexpected demand for LNG. However, the average premium on Qatari LNG price did not change. This results are due to their exporting routes of Qatar. Qatar had exported the LNG to Europe as well as the Northeast Asia but there was decrease in natural gas demand in Europe. Thus, Qatar had to cope with excessive LNG volumes so they turned their LNG volume, which had headed towards Europe, to Asia with their unchanged premium.

The overall increases in the average level of premium were higher for japan than Korea. This results can be explained partly by the difference in buying power between Korea and Japan. Korea has Korea Gas Corporation which is the world's largest LNG buyer as a single corporation but there are a considerable number of LNG importers in Japan. Thus, each firm's buying power is weaker than Korea, though Japan is the largest LNG importer.

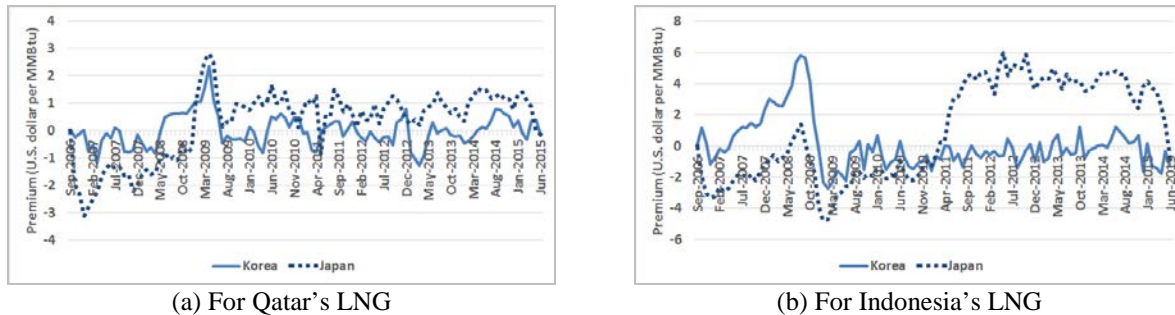| (a) For Qatar's LNG | (b) For Indonesia's LNG |

Figure 1. The Premium on the LNG importing price

Conclusions

This study could find some policy and strategy implications on the Northeast Asian LNG market. Firstly, when LNG importing countires try to diversify their import routes, they should also concentrate on re-negotiations with existing exporting countries since the appearances of new supplier, Russian, did not always mean the decrease in the premium of LNG. Second, LNG importers in the Northeast Asia should be attention to demand and supply of other region as well as that in Asian region. Third, Korea, Japan, and other Northeast Asian countries should establish a close cooperation to enhance their buying and negotiation power on the global LNG market.

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