

DETERMINANTS OF LIQUEFIED NATURAL GAS PRICES

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Overview

This study provides a comprehensive review of the literature on the determinants of liquefied natural gas prices (LNG). There have been some studies describing the institutional and structural features of the global LNG market, e.g., (EIA, 2017). A few of the empirical studies, in contrast to purely descriptive studies, of natural gas (NG) market integration have tended to focus on within country relations and prices along the upstream-downstream chain, using earlier data with a limited set of global information. Given the current expanding global supply, demand, and trade for LNG and the fact that prior studies focused on price behavior during the early stages of this segmented market, it is imperative to undertake a study of prices and market behavior including observations in recent developments.

Methods

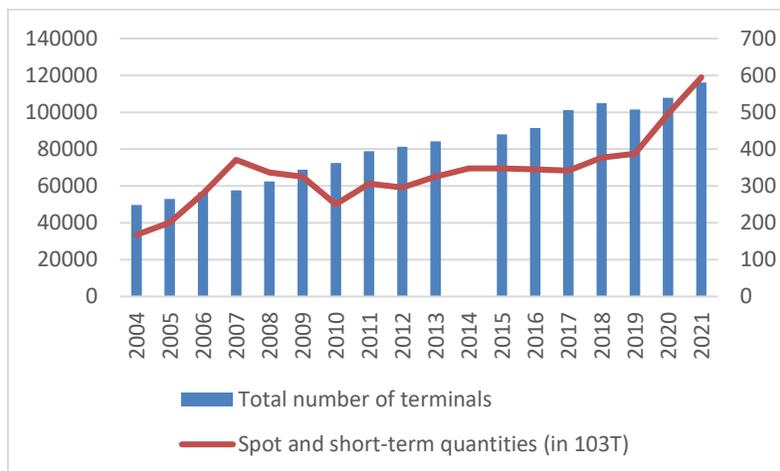
We summarize papers that address the following questions. We also conduct empirical analysis to verify and/or provide new findings to some of these questions to answer if, how, and/or why these relationships have changed over time.

1. Does a higher number of importing terminals lead to a higher share of LNG spot trading?
2. Does a higher share of spot trading contribute to greater market integration/price?
3. Has higher shale gas production reduced NG volatility?
4. Has the US dollar (USD) and NG price correlation become more significant (compared with USD and oil price correlation)?
5. Is the LNG price tied to oil and/or coal and how has the relation changed?
6. Are global LNG prices cointegrated with the hypothesis that the LNG market has become integrated?
7. Has the cointegration relation between prices changed over time?
8. Has the relation between prices changed over time causing them to converge to the physical no arbitrage relationship?

Results

Our empirical results answer the questions above. For example, we find positive support for Question 1 (see Figure 1 and Table 1).

Figure 1: Time Series of Regasification Capacity and Spot Trading



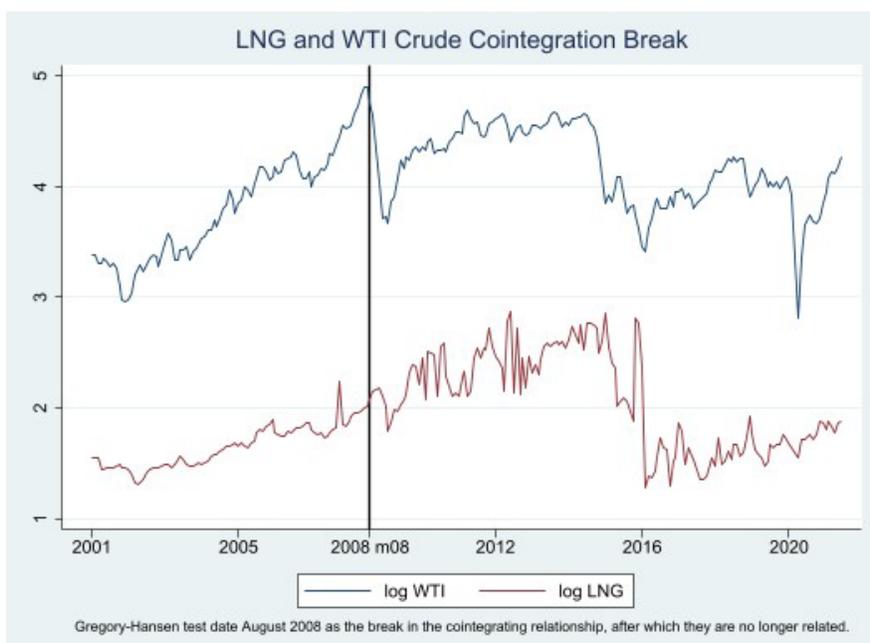
* Short-term trading is defined as any contract that is less than four years.

Source: Data is obtained from (GIIGNL, 2004-2021) annual reports over the period 2004-2021.

Table 1: Correlations between Capacity and Short-Term Contracts

| | <i>Total Regasification Capacity (MTPA)</i> | <i>Total number of terminals</i> | <i>Spot and short-term quantities (in 10³T)</i> |
|---|---|----------------------------------|--|
| Total Regasification Capacity (MTPA) | 1 | | |
| Total number of terminals | 0.9957 | 1 | |
| Spot and short-term quantities (in 10 ³ T) | 0.7808 | 0.7884 | 1 |

Additionally, using the latest data, we confirm the structural break identified in many studies (see Figure 2).

Figure 2: LNG and WTI Crude Cointegration Break

Conclusions

It is quite evident that the primary focus of the academic literature has been on oil and NG markets. Despite its' growing global importance, LNG has lacked a similar spotlight. A few studies have ventured into analyzing LNG markets at a cursory level. At the same time, few seminal empirical works have utilized LNG specific data, instead opting to utilize NG data to draw diffuse conclusions for LNG. This basic fact underscores the need for an expanded literature devoted to LNG research.

Many econometric developments have occurred in recent years. We summarize important empirical model extensions for future LNG analyses in our study including the following techniques: long-run dynamics (cointegration and vector error correction), short-run dynamics (vector autoregression), volatility forecasting (GARCH) and price forecasting (time-series models).

References

Note: Extensive references are provided in the paper. The following references are cited in this abstract.

EIA, 2017. Perspectives on the Development of LNG Market Hubs in the Asia Pacific Region. EIA 8.

GIIGNL, 2021 - 2004. GIIGNL Annual Report.