Prices and trade in global LNG markets

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2014 CUEN Annual Conference

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June 2014

Overview of this talk

Explaining global gas prices & LNG trade flows:

1. LNG producers have significant market power
2. Limits to price arbitrage in global LNG

Two cases of particular interest & importance:

1. Qatar LNG sales to Japan & UK
2. Potential impact of US LNG exports

Evolution of LNG market since 2000

Large growth in LNG volumes & values

- Increased investment in LNG infrastructure
- Larger LNG shipping fleet & lower transport costs

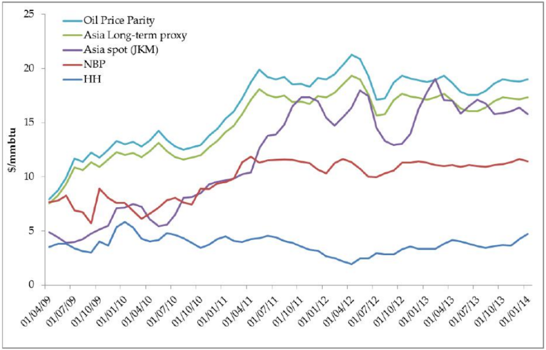
LNG connects previously separate geographies

- More flexible contracting between buyers & sellers
- Ongoing shift away from bilateral long-term contracts
- Short-term LNG now 25% of total ($\uparrow$10-fold since 2000)

$\Longrightarrow$ **Widespread conjecture of global gas price convergence**

Price non-convergence: Irrationality?

Some commentators argue LNG players acting "irrationally"



- Major exporters sell short-term LNG to both Asia & Europe
- Forgone profit $=$ $|$Price differential$|$ $\times$ Quantity sold to Europe?
  - Up to \$100m *per day* for Qatar (Japan vs UK)

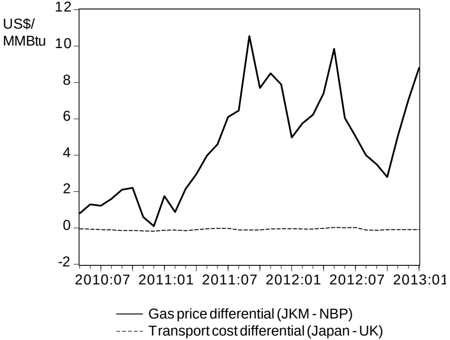
$\Longrightarrow$ **LNG exporters failing to engage in price arbitrage**?

An explanation based on transport costs?

Competitive model predicts netbacks equalized across markets

- So regional price differential = difference in transport costs

Figure: Qatar LNG sales to Japan & UK



$\Longrightarrow$ **Competitive model cannot explain observed gas prices**

Understanding a profit-maximizing LNG exporter

A producer sells uncommitted LNG into several export markets

Fundamental condition for profit-maximization in each market:

$$\underbrace{\text{marginal revenue}}_{\text{price adjusted for market power}} = \text{production cost} + \text{transport cost}$$

- Producer equalizes marginal revenues (net of transport costs)
- Prices *optimally* far apart if demand conditions very different

$\Longrightarrow$ **Key point**: **Market power easily rationalizes observed prices**

Case study: Qatari short-term LNG exports in 2012

Rough indicative estimates of price-cost margins:

$\Longrightarrow$ **Significant mark-ups to both markets, much higher for Japan**

Data sources: Bloomberg, IEA, Poten & Partners, own calculations

JP Morgan Cazenove 2012 LNG industry report

"The entry barriers to LNG trading are surprisingly high—new entrants ... must have access to cargoes, but the market's liquidity is typically held captive by the LNG liquefaction owners/upstream suppliers who are understandably very reluctant to release volumes for traders to trade with."

"Traders must also have access to shipping, either via owned vessels or the charter market. Furthermore, certain ships can unload only at certain terminals ... this can make it even more difficult to efficiently connect volumes to buyers."

- **Other arbitrage considerations**: Time, risk, market power

The special case of the US

Several reasons for recent US price divergence

1. Shale gas has pushed down US natural gas prices
2. Infrastructure reflects vision of US as major LNG *importer*

$\Longrightarrow$ US market largely isolated from the rest of the world

What if US becomes a large-scale LNG exporter?

- US & non-US prices will not necessarily converge (or netbacks)
- Analysis of US LNG exports incomplete without market power

Conclusions & outlook

Summary of main results

1. Market power necessary to explain recent prices & trade flows
2. Large exporters not textbook price-takers + limits to arbitrage
3. Market power *not* always bad—improves investment incentives

Greater LNG price arbitrage in the future?

- Good for Asian buyers, bad for Europeans (net gains in aggregate)
- Large shifts in value along LNG supply chain & across producers

Recent EPRG research on global gas

Thank you for listening

This talk is largely based on a recent research paper:

Robert A. Ritz (2013). "Price discrimination and limits to arbitrage in global LNG markets." EPRG Working Paper 1317, September 2013 (updated February 2014)

Available at: http://www.econ.cam.ac.uk/faculty/ritz

Comments & feedback welcome
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