UNIVERSITY OF CAMBRIDGE | Energy Policy Research Group

A strategic perspective on competition in international natural gas markets

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Competition in global gas markets

Global gas fundamentally changed over last 10 years

Traditionally, pipeline projects with long-term contracts

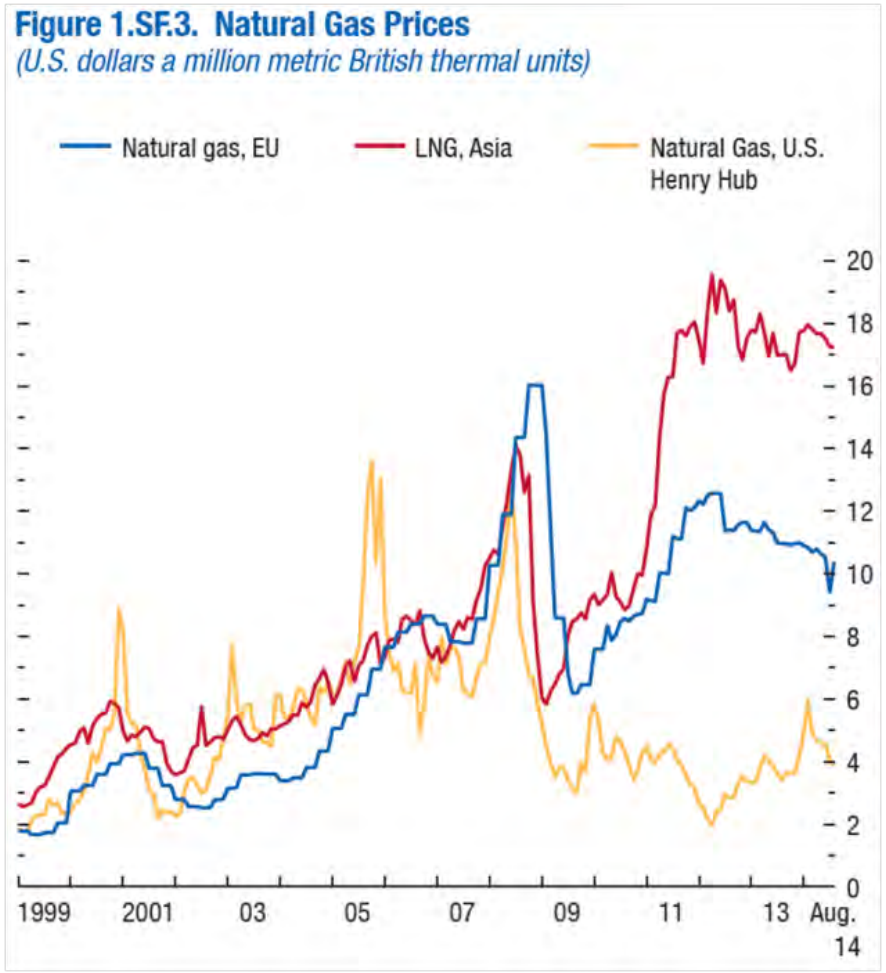
- High investment costs & degree of “asset specificity”

Today, increasingly trade in liquefied natural gas (LNG)

- Seller has choice over exporting to different regions
- Fukushima accident highlighted role of flexible LNG

⇒ **Head-to-head competition of piped gas & LNG (today especially in European market)**

Global gas prices & LNG market power



Source: IMF World Economic Outlook (October 2014)

10 years ago: Single global gas price due to LNG trade?

2010s: LNG exporters failing to arbitrage prices?

- **Qatar**: "Forgone profit" up to US$100 million per day?
  - Estimates for short-term sales to UK vs Japan during 2011

⇒ **Global prices explained by LNG market power**

Why (else) is global gas interesting?

① **US** looks set to become major **LNG exporter** due to shale gas "revolution"

② Re-emergence of **energy security** concerns due to Russia-Ukraine crisis

③ Potential role of natural gas in achieving medium-term **climate policy targets**

④ **Longer-term evolution** of natural gas market: Gas = "just another commodity" (like oil)?

Key points made in this talk

① Pipeline gas has a strategic advantage over multi-market LNG exporters

- Gazprom's traditional focus on Europe may be *good* news for "security of supply"

② Gazprom benefited from Fukushima in the short run, but lost over the longer term

- European gas buyers lost out too

③ Strategic perspective on 2014 gas deals between Russia & China

- "Power of Siberia" deal to develop new gas dedicated to China strategically better than "Altai"

Setup of the model

Multimarket competition between LNG & piped gas:

- Firm 1 sells into markets *A* and *B* (= Qatar to Asia & Europe)
- Firm 2 can sell only into market *B* (= Gazprom to Europe)

Game plays out in two stages:

① Firms invest in production capacities
② Firms decide how much to sell to each export market

Key assumptions for the results:

- Subgame-perfect Nash equilibrium
- Competition in strategic substitutes
- Both producers are capacity-constrained
- No price arbitrage by 3rd party traders

Strategic effect of multi-market exposure

Global capacity of firm 1 links markets via supply-side

Firm 2 "overinvests" in capacity in Stage 1 to gain market share in common market *B*

- In Stage 2, firm 1 has an alternative use for its capacity & equalizes "marginal revenue" across markets
  - Firm 2 does *not* ("asset specificity" of piped gas)

- **Magnitude of this *strategic effect* depends on:**
  ① Firm 1's ability to capture surplus in market *A*
  ② Relative sizes of markets *A* and *B*

Competitive advantage of pipeline gas

Proposition*. Firm 2 has a strategic advantage over multi-market firm 1 in common market *B

- Firm 2's = quasi-Stackelberg leader
- Overturns fundamental result from oligopoly theory: Higher-cost firm can have *higher* market share/profits

Implications for security of supply*

① Gazprom's traditional focus on Europe may be *good* for gas buyers & security of supply

② Herfindahl index as inverse security measure (e.g., European Commission) can yield "wrong" result

* The model ignores many relevant issues; it offers a test of "conventional wisdom" on supply security

Short-run impacts of Fukushima accident

Table 1: Asian LNG prices (JKM) and European gas prices (NBP) around the Fukushima accident (11 March 2011) in US$/MMbtu (Source: Platts)

	10 Mar	11 Mar	14 Mar	15 Mar	16 Mar	% change
JKM	9.40	9.90	11.00	10.95	11.35	+20.7%
NBP	9.30	9.60	10.20	10.50	10.50	+12.9%

Over next year, LNG imports up by 25% & price up by 50%

What are the short-term spillover effects for Europe?

Capacity constraint of LNG exporters ⇒

① European gas buyers lose out

② Gazprom gains European market share

Longer-term impacts of Fukushima accident

Over longer term, firms can re-optimize their capacity levels

Proposition*. Under plausible (technical) conditions, higher demand in market *A* raises the price & *lowers* firm 2's market share in market *B

Intuition:

- Fukushima allows LNG exporters to capture more surplus…
  … which reduces the adverse impact of strategic effect
- So LNG exporters respond by raising capacity investment…
  … which enables them to gain European market share

NB. Empirical evidence is limited & needs more work

Recent gas deals between Russia & China

May 2014: Russia & China $400bn "Power of Siberia" deal

- Largest-ever contract in history of gas
- Deliveries to start in 2018 for 30 years
- Price close to recent German gas imports
- China to extend $25bn of financing

November 2014: "Altai" deal for Western Siberian gas

FINANCIAL TIMES

Putin snubs Europe with Siberian gas deal that bolsters China ties

Russia as "swing producer" between Europe & Asia?

Analysis of Russia's gas export strategy

① **"Power of Siberia" deal does *not* expose Russia** to multi-market strategic vulnerability of LNG – since this is new gas dedicated to China

② **"Altai" deal is *less* attractive from strategic viewpoint** as it involves existing gas that has gone to Europe – this can undermine Gazprom's European position

③ More generally, **diversification of a traditional pipeline exporter into LNG may come at a strategic cost**

Other issues & model extensions

① Role of **uncertainty** over market conditions

② **Non-profit objectives** & state ownership

③ **Empirical work** on international gas markets

④ Any **other ideas**… ?

References

Thank you for listening!

Comments welcome:
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This talk is based on:

- Ritz, R.A. (2015), "Strategic investment and international spillovers in natural gas markets", Cambridge EPRG Working Paper 15-02, February 2015

It is also related to:

- Ritz, R.A. (2014), "Price discrimination and limits to arbitrage: An analysis of global LNG markets", *Energy Economics* 45, September 2014, pp. 324–332