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Strategic investment and international spillovers in natural gas markets

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All views expressed and any errors are mine.

Overview of this talk

① Background on global gas markets

② Model of competition between pipeline gas & liquefied natural gas (LNG)

③ Analysis of competitive advantage & implications for “security of supply”

④ How did the Fukushima accident affect European gas markets?

⑤ Russia’s gas export strategy

Competition in global gas markets

Global gas fundamentally changed over last 10 years

Traditionally, pipeline projects with long-term contracts

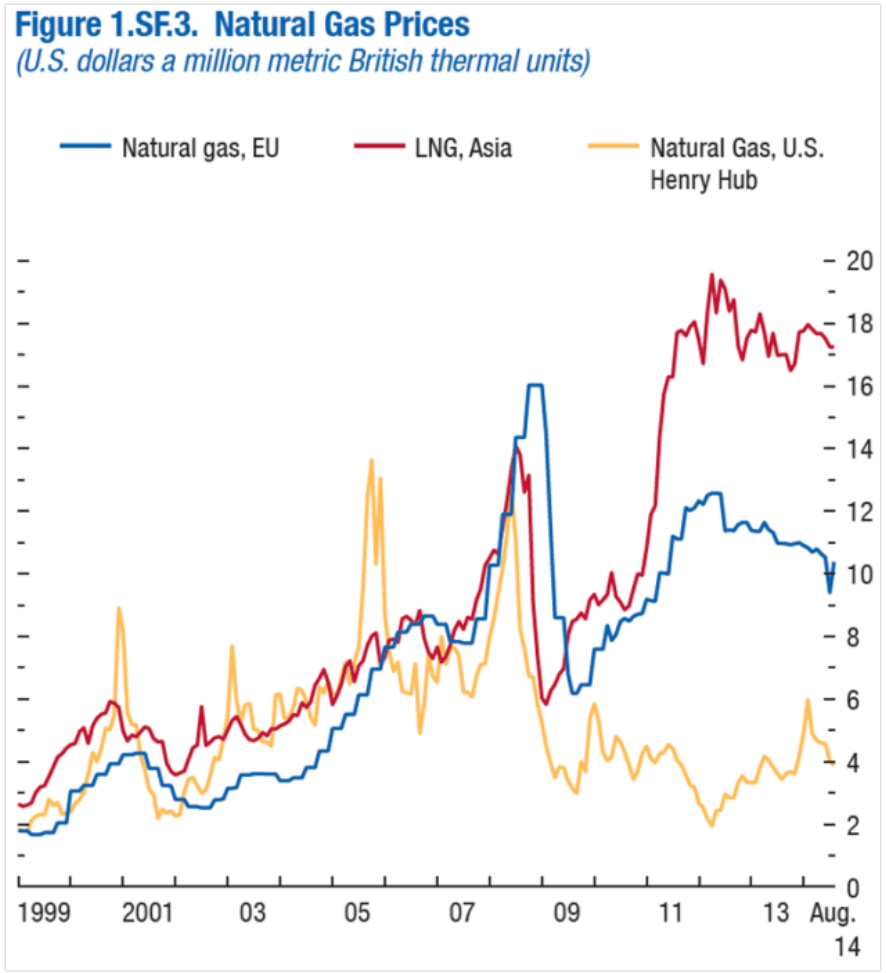
- High investment costs & *asset specificity*
  Gas pipeline is physically bound from A to B, no alternative use

Today, significant trade in liquefied natural gas (LNG)

- Seller has *choice* over which country to export to
  2011 Fukushima accident highlighted role of flexible LNG

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

Natural gas prices & LNG market power



Source: IMF World Economic Outlook (October 2014)

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

2010s: LNG exporters failing to arbitrage prices?

⇒ **Global prices explained by market power**

+ limits to arbitrage in LNG shipping

Other price drivers:

- Differences in transport costs (✓)
- LNG import capacity constraints ✗

A stylized model of global gas markets

Multimarket competition

- Firm 1 sells into markets *A* & *B*
  = Qatar LNG to Asia & Europe
- Firm 2 can sell only into market *B*
  = Gazprom/Russia to Europe

Demand conditions

- Market *A* has log-concave demand
- Market *B* has linear demand

⇒ Competition in strategic substitutes

Timing of the game

① Firms invest in capacities
② Firms make export decisions

Other assumptions

- Both producers are capacity-constrained ✓
- No 3rd party price arbitrage between markets (✓)

Strategic advantage of piped gas over LNG

Proposition. **Firm 2 (pipeline) has a strategic advantage over multimarket firm 1 (LNG) in common market *B***

Key: Firm 1's global LNG capacity links A & B via supply-side

- Firm 2 "overinvests" in capacity in Stage 1 to gain market share (and profits) in common market *B*
  Why? In Stage 2:
  - Firm 1 has an alternative use for its capacity & equalizes "marginal revenues" across markets
    - But firm 2 does *not* (pipeline asset specificity)

⇒ **Pipeline gas as "quasi-Stackelberg leader" over LNG**

Implications for "security of supply"

General definition (Daniel Yergin)

"*Availability of sufficient supplies at affordable prices*"

≈ (expected) consumer surplus

Simplest example of Stackelberg effect:

Cournot: Q={1/3,1/3}, P=1/3, CS=44%, H=1/2

Stackelberg: Q={1/2,1/4}, P=1/4, CS=56%, H=5/9

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

② Herfindahl index as measure of supply security (e.g., European Commission) can give "wrong" result*

⇒ **Stackelberg *raises* Herfindahl *and* consumer welfare**

*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, Japan's LNG imports up 25% & price up 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 makes Gazprom *lose* European market share

⇒ **Gazprom benefited from Fukushima in SR but lost in LR**

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**