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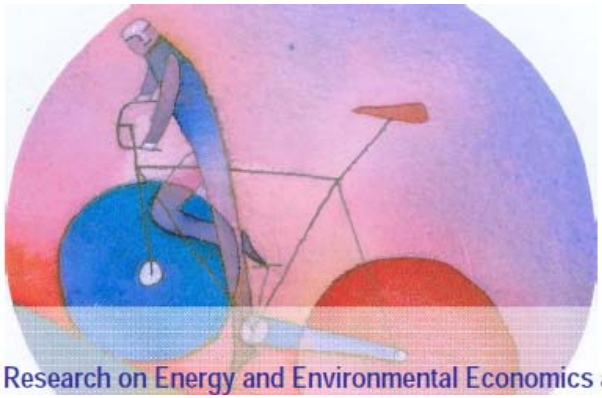

Liberalizing the Gas Industry: Take-or-Pay Contracts, Retail Competition and Wholesale Trade

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Motivation

- The liberalization of the natural gas industry is a hot topic in the European policy agenda
- Until recently, focus on the security of supply and the problem of access to transport infrastructures (upstream segments)
- Competition downstream and the development of wholesale markets are emerging themes
- We argue that, contrary to the electricity market, there is not, so far, a common view on how competition works in the gas market
- We analyze entry and competition in the downstream segments (retail) once (assuming) the access problems is solved.
- Policy issue: Are we sure that ensuring Third Party Access (TPA) to infrastructure is sufficient to obtain competition in the downstream market?

Long term contracts and TOP

- The upstream segment is still dominated by long term contracts with:
  - **Take-or-pay** quantity obligations + upward flexibility
  - **Price indexed to oil**
- Italy:
  - **2005-2008**: total demand slightly above production + TOP obligations, and below production + TOP + upward flexibility
  - **2009-2011**: total demand below production + TOP obligations
- Even before the crisis, TOP obligations cover most of the demand
- How TOP contracts affect downstream competition?

Three features of the gas industry

- Three key features of the gas industry after liberalization plans:
  - **Wholesale activity**: long-term import contracts with take-or-pay obligations:
    - Zero marginal costs on a relevant portion of capacity
  - **Retail activity**: retailers have to select the submarkets to serve, with some limited scope for differentiation in services:
    - Retail market can be opened to competition and ensure small but positive margins.
  - **Market organization**: no separation of wholesale and retail activities, absence of a wholesale market, bilateral contracts:
    - Retailers with TOP obligations have to design marketing strategies and select which clients to approach

Results

- If the incumbent's TOP portfolio does not cover the entire demand, **entry** occurs
- But the firms avoid face-to-face competition and select different submarkets, setting high (monopoly) prices in each of them (**market segmentation**);
- Imposing **antitrust ceilings** modifies the allocation of market shares but maintains segmentation and high prices in most of the market;
- Introducing a **compulsory wholesale market** determines generalized entry and retail competition and does **no**t require **unbundling** of retail and wholesale activities
- Introducing **restrictions** (linear prices) **on wholesale contracts** is effective only with **ownership unbundling** of retail and wholesale activities

The model : demand

- Total demand D is **inelastic** and can be divided into different **submarkets** (by location and/or type of end user – domestic, industrial, power, etc.)

- In each submarket the active retailers offering gas are perceived as **differentiated** (by location, commercial services etc.):

  – Competition in the retail segment allows obtaining small but positive margins, i.e. **competition is viable and liberalization is justified**

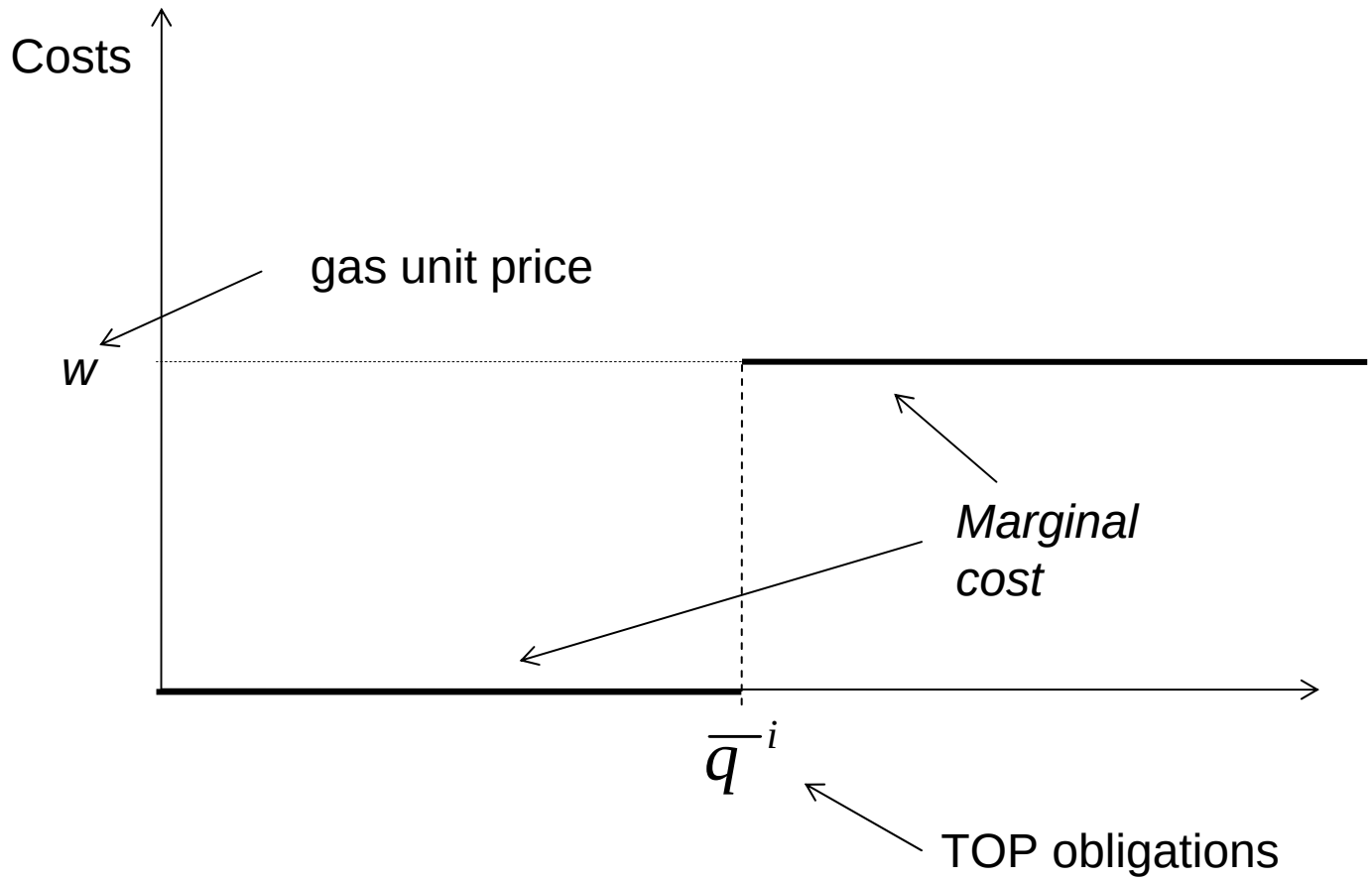
The model : supply

- **Wholesale activity**: buy gas from the producers/importers under TOP obligations
- **Retail activity**: select the submarkets and sell gas to final users
- Retail and wholesale activities are **bundled** within each company. Hence**, operators buy gas under TOP obligations and select submarkets where they resell gas to final users**
- Two operators, incumbent *I* (large, with an established customer base) and competitor *C*
- TOP obligations:

$$\bar{q}^{I} \leq D$$

$$\bar{q}^{C} = D - \bar{q}^{I}$$

The cost function



The model: timing

Period t_1:

- *I* decides whether to enter market 1 (equal to I's TOP obligations)
- *C* observes *I*'s choice and decides whether to enter market 1
- the active firm(s) post (simultaneously) a price;

Period t_2:

- *I* decides whether to enter market 2 (equal to C's TOP obligations),
- *C* observes I's choice and decides whether to enter market 2
- the active firm(s) post (simultaneously) a price;

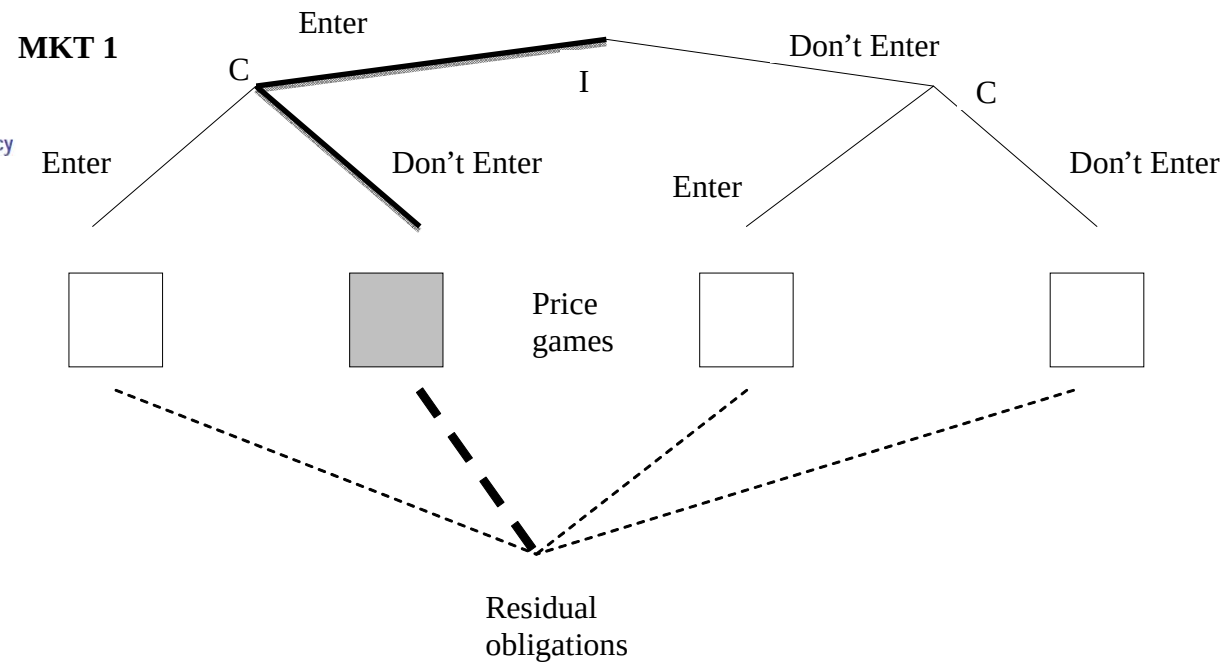
Strategic link between the two markets: residual TOP obligations

TOP obligations, price competition and entry

- **Symmetric price competition:**
  - When both firms compete still having TOP obligations (high marginal cost *0*) or having exhausted them (low marginal cost *w*), both obtain positive sales and magins over the relevant marginal cost, due to product differentiation;
- **Asymmetric price competition:**
  - When a firm with no residual TOP obligations (high marginal cost *w*) competes with a firm still burdened by TOP obligations (low marginal cost *0*), the former gets no sales and profits;
- **Entry in the second market:**
  - A firm enters in market 2 if it has residual obligations, otherwise it stays out.

First market equilibrium and entry

- **If both *I* and *C* enter:**
  - both obtain low **competitive** margins in **market 1** and retain positive residual capacity
  - therefore they both enter in **market 2**, again with low **competitive** margins;
- **Alternatively, if *I* enters but C does not enter:**
  - firm ***I*** sets a high (**monopoly**) price in **market 1**,
  - exhausts its TOP obligations in the first market
  - and does not enter **market 2**, where ***C*** enters as a **monopolist**.


MKT 1
Enter
C
I
Don't Enter
C
Enter
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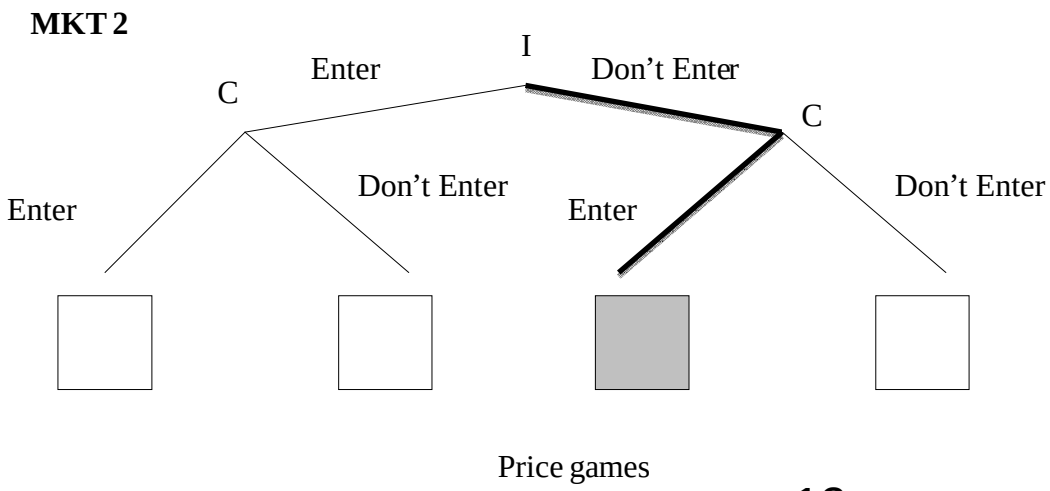
Enter
Don't Enter
Price
games
Residual
obligations


MKT 2
I
Enter
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C
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Don't Enter
Price games

Equilibrium

- **Proposition:** *When* $\bar{q}^I = D$, *in the unique subgame perfect equilibrium the incumbent enters the market and charges the monopoly price while the competitor stays out.*
- **Proposition:** *When* $\bar{q}^I < D$ *, in the unique subgame perfect equilibrium the incumbent enters the first market, the competitor enters the second market and both firms set the monopoly price.*
- **Proposition:** *If the competitor chooses its TOP obligations before the entry game is played, C chooses obligations equal to the residual demand, i.e.*

$$\bar{q}^C = D - \bar{q}^I$$

- *Hence, we obtain* <u>*entry without competition*</u> *and a marginal role for the entrant*

Policies: (1) antitrust ceilings

- UK, Spain and Italy have introduced **gas release programs** or **antitrust ceilings** to limit the market share of the incumbent and encourage entry.

- If the incumbent can transfer part of its TOP obligations, the previous arguments apply, with different market shares.
  - Redistribution of rents – no positive effects for consumers.

- If the incumbent retains its TOP obligations but has to sell some gas (*q'*) at its marginal cost *w*, this portion of the market will be served at the competitive price
  - Some positive effects on consumers (on *q'* units)

Policies (2): compulsory wholesale market

- **Compulsory wholesale market**:
  - all gas bought wholesale upstream must be sold in an anonymous market
  - retailers must buy their gas (to be resold downstream) from this market
  - A dispatcher collects the wholesale bids, forms a merit order and commands the wholesalers how much to supply at a common wholesale price

- Retailers still choose which submarkets to serve and offer a differentiated service, but now they have a flat marginal cost equal to the wholesale price > generalized entry and competition

Policies (2): compulsory wholesale market

- Wholesale price covers costs and TOP obligations: $p_w = w$
- Competitive retail prices $$p = p_w + \frac{\psi}{2}$$
- No need to unbundle wholesale and retail activities: the dispatcher creates a separation between wholesale and retail decisions, avoiding strategic manipulation
- Even without controlling the final market, the wholesalers meet their TOP obligations
- If competition in the wholesale market is relaxed , $p_w > w$ and the retail price increases accordingly.

Policies (3): restrictions on wholesale contracts

- Possibile **restrictions on the contracts** between the wholesale unit and the retail unit of the firms
  - Linear contracts
  - No price discrimination
  - Obligation to serve all demand at posted prices

- Ownership unbundling: generalized entry and competition

$$p_w = w \text{ and } p = p_w + \frac{\psi}{2}$$

- Vertical integration: $p_w > w$, nobody buys from rival firms
  - Segmentation persists

Conclusions

- Solving the access problem to infrastructures is not enough
  - If retailers have TOP obligations, segmentation and monopoly prices emerge
  - Gas release programs have at most a marginal effect on consumers

- A compulsory wholesale market induces generalized entry and competitive margins in the retail market
  - Creating a market is not easy, although gas hubs are developing across Europe, firstly motivated by balancing services and then feeding spot trade and gas-to-gas competition
- Restrictions on wholesale contracts are effective only with unbundling
  - Forcing unbundling is not easy