

# Take or Pay Contracts and Market Segmentation

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# 1 Motivation and Results

- The liberalization of the natural gas industry is a hot topic in the European policy agenda
- Focus on the security of supply and the problem of access to transport infrastructures (upstream segments)
- We want to analyze entry and competition in the downstream segments (retail) once (assuming) the access problems is solved.

Three key features of the gas industry after liberalization plans:

- Long-term import contracts with take-or-pay obligations:
  - zero marginal costs on a relevant portion of capacity
- Absence of a wholesale market:
  - retailers have to design marketing strategies and select which clients to approach
- Gas is a commodity:
  - limited scope for product differentiation at the retail level

## Results:

- If the incumbent's TOP portfolio does not cover the entire demand, entry occurs;
- The incumbent and the entrant select different subsets of clients and set monopoly price (market segmentation), hence, we observe entry without competition;
- Imposing antitrust ceilings or gas release obligations to the incumbent modifies the allocation of market shares but does not promote competition in the retail segment;
- A compulsory wholesale market determines generalized entry and retail competition; the overall outcome is not worse than a decentralized market.

## 2 Related literature

- TOP contracts:
  - Cretì and Villeneuve (2004), Crocker and Masten (1985), Weiner (1986).
  - These papers focus on the reasons why TOP are adopted looking at the relationship of the producer and the importer; no analysis on the impact of TOP on downstream competition
- Market competition with capacity constraints or decreasing returns:
  - Kreps and Scheinkman (1983), Davidson and Foray (1986), Vives (1986), Klemperer and Meyer (1989), Maggi (1996)

### 3 The model

- Firms:  $I$  and  $E$
- Costs:
  - TOP obligations:  $\bar{q}_i$
  - Unit cost of gas:  $w$

$$C_i(q_i, \bar{q}_i) = \begin{cases} w\bar{q}_i & \text{for } 0 \leq q_i \leq \bar{q}_i \\ w\bar{q}_i + w(q_i - \bar{q}_i) & \text{for } q_i \geq \bar{q}_i \end{cases}$$

- Demand:
  - Total demand  $D$  fixed
  - (limited) horizontal differentiation in commercial services (a la Hotelling)
- TOP obligations and capacities:
  - $\bar{q}_I \leq D$  and  $\bar{q}_E = D - \bar{q}_I$  (later on  $\bar{q}_E$  endogenized), no absolute capacity constraint
- Entry and competition:
  - – Customers are approached sequentially; once approached, the (active) firms offer a price simultaneously;
  - – The incumbent has a first mover advantage in approaching any customer;
  - – We can analyze entry decisions grouping customers in two submarkets: market 1 as  $D_1 = \bar{q}_I$  and market 2 as  $D_2 = \bar{q}_E$ .

- Timing:

$t_1$ :  $I$  and then  $E$  decide whether to enter or not in market 1; once entry decisions are taken, price(s) are set simultaneously;

$t_2$ :  $I$  and then  $E$  decide whether to enter or not in market 2; once entry decisions are taken, price(s) are set simultaneously.

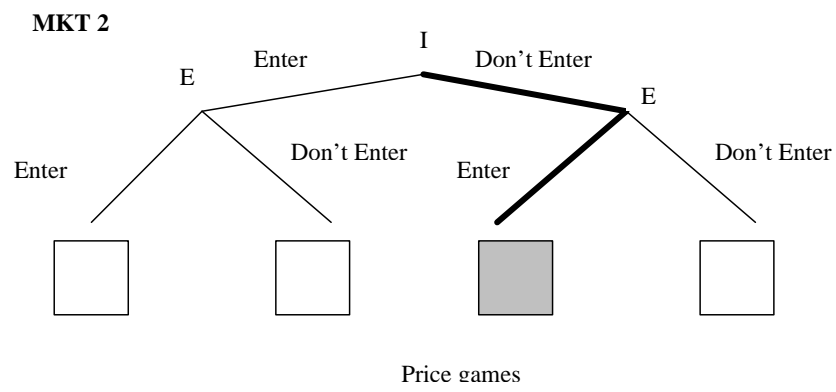
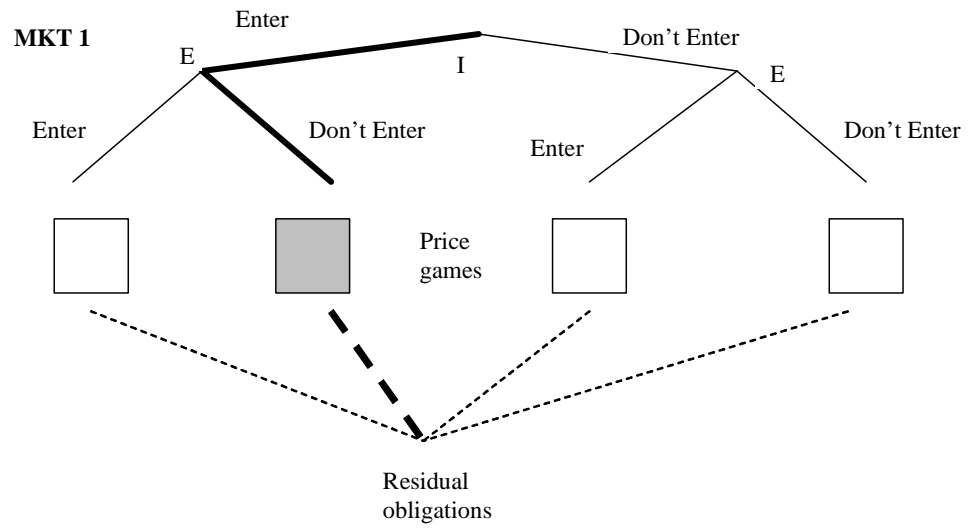
## 4 Equilibrium (sketch)

Price Competition:

- When both firms compete with low ( $l$ ) or high ( $w$ ) marginal costs, both obtain positive sales and profits;
- When a high marginal cost firm competes with a low marginal cost rival, the former gets no sales and profits;

Entry:

- In Market 2 a firm enters if it has residual obligations, otherwise it stays out.
- In Market 1 firm  $I$  enters;
  - If firm  $E$  enters, low margins in market 1, both firms have residual capacities and enter in market 2, again with low margins;
  - If firm  $E$  does not enter, firm  $I$  exhausts its TOP obligations and does not enter in market 2, where  $E$  can enter as a monopolist.





**Proposition 1** *When  $\bar{q}^I < D$ , in the unique subgame perfect equilibrium, the incumbent enters in the first market, while the entrant enters in the second market. Both firms charge to their customer(s) the monopoly price  $u^* - \frac{9}{16}\psi$ .*

**Corollary 2** *When  $\bar{q}^I = D$ , in the unique subgame perfect equilibrium, the incumbent enters in the market and charges the monopoly price  $u^* - \frac{9}{16}\psi$ , while the (potential) entrant does not enter.*

**Proposition 3** *If the entrant chooses its obligations  $\bar{q}_E$  at time 0, given the incumbent's obligations  $\bar{q}_I$ , and then the game follows as in the benchmark model, the entrant chooses obligations equal to the residual demand, i.e.  $\bar{q}_E = D - \bar{q}_I$ .*

## 5 Policies

- We obtain entry without competition: no benefit for consumers from liberalization. Hence, additional policies are needed

### 5.1 Antitrust ceilings

- Some countries (UK, Spain, Italy) have introduced market share ceilings or gas release programs upon the incumbent to reduce its dominance and make entry easier

**Proposition 4** *If the incumbent cannot hold more than  $\hat{q}_I < \bar{q}_I$  TOP obligations,  $I$  enters market  $\hat{D}_1 = \hat{q}_I$ ,  $E$  enters market  $\hat{D}_2 = D - \hat{q}_I$  and both set the monopoly price. Hence, antitrust ceilings shift only market shares from  $I$  to  $E$*

## 5.2 Wholesale market

- Consider the creation of a compulsory wholesale market where the importers, burdened with TOP obligations, sell, and the retailers buy whatever amount of gas at the wholesale price  $p_w$  (with no TOP obligation)
- The retailers now have a flat marginal cost at  $p_w$  for any amount of gas
- Entry in any submarket is always profitable (product differentiation)
- We obtain generalized entry and low margins over the wholesale price  $p_w$ : the final price is  $p = p_w + \frac{\psi}{2}$
- The wholesale price  $p_w$  depends on the competitive conditions in the wholesale market:  $p_w \in [w, u^* - \frac{17}{16}\psi]$
- The final price, in any case, cannot be higher than the monopoly price  $u^* - \frac{9}{16}\psi$ .

## 6 Conclusions

- Liberalization plans have failed, so far, to consider competition in the downstream market, focussing on the upstream market (security of supply and access to transport infrastructures)
- The combination of TOP obligations and market decentralization can create strong incentives to market segmentation, inducing entry without competition
- Antitrust ceilings or gas release programs can create room for additional entry, but do not induce competition
- A compulsory wholesale market can create generalized competition in the retail segment; competition in the wholesale market remains an issue, but the outcome cannot be worse than that of market segmentation