The Economics of Energy Markets,

January 29 2010

Generation Investment and Access Regulation in the Electricity Market: a Real Option Approach

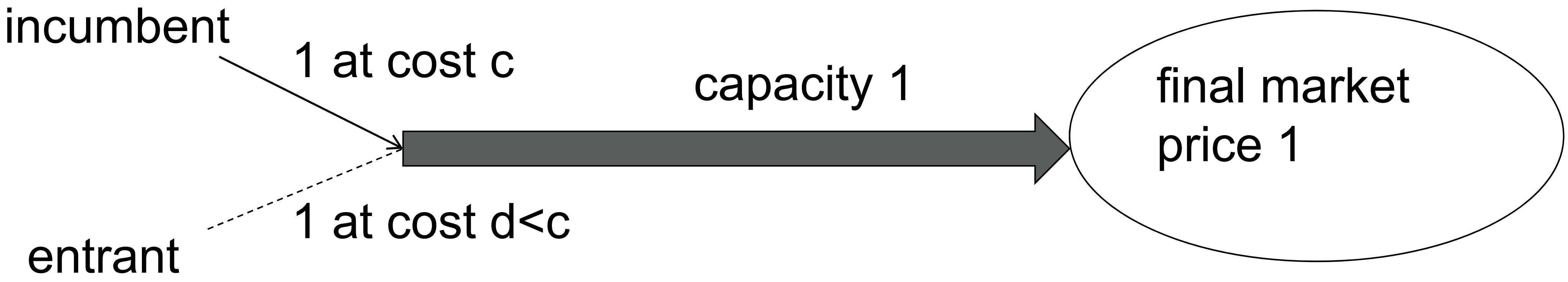
J. Dijk, G. Petropoulos, B. Willem

Discussion by Bruno JULLIEN

General considerations

- Nice paper
  - Simple set-up for a complex issue
  - Captures essential trade-off
- The trade-off between short-run efficiency and long-run investment incentives is currently a hot issue
  - Telecommunication, rail
- Preliminary remark
  - With nodal prices and competition, the industry resembles many other non-regulated industries
    - A paper or cement producer also faces a dynamic investment problem with option values and preemption effects
  - Do we care more in the case of energy than for other cases and why?
  - Should we let the market organize itself under standard anti-trust rules?

Nodal prices date 2



- Nodal prices work like an auction with reserve price 1 for the capacity 1
- Spot-efficient : low cost win
- Entry game at date 2 : enter then price is determined (like a participation in auction)
  - There are inefficient equilibria in general
  - Here the paper assumes that the short-term entry equilibrium is efficient and focuses on dynamics incentives
  - Thus I wins if F+m< G where m=c-d is the cost advantage of entrant

The dynamics issue

- Only the incumbent can invest in period 1
- Conditional on first period investment, the second period entry outcome will be efficient, so the question is to achieve efficient first period investment decision
- Optimal timing of investment (welfare)
    - accounting for durability → invest sooner
    - option values → invest latter
- Private incentives
    - The second period incumbent's profit doesn't is not aligned with social welfare
    - Strategic barriers to entry: preemption

Dynamic incentive

- Welfare → invest early if

$$\mu-(1-\delta)F-\delta\left\{\Pr(G<m)F+\int_{m}^{m+F}(F+m-G)f(G)dG\right\}>0$$

- Firm → invest early if

option value

$$\mu-(1-\delta)F-\delta\left\{\Pr(G<m)F\right\}+\delta\int_{m}^{m+F}(1-F-m)f(G)dG>0$$

preemption

- There is overinvestement

Comments on the option value model

- The over-investment effect results from two effects
  - Smaller private option value
  - préemption
- Here demand is inelastic, with elastic demand the surplus is larger then profit in period 1 $\longrightarrow$ *underinvestment*
- Private option value could be higher if there is no financial cost
  - the firm may support a “distress” cost in case it cannot recover the investment in period 2 $\rightarrow$ *underinvestment*

Physical transmission rights

- For a price P the firm obtains a monopoly right on the node capacity: The outcome is the same as with an integrated monopoly at the node with a price cap → Cost efficiency
- The secondary market for the right is efficient, but market power generate inefficiencies
  - If bargaining occurs after investment, there is no entry !!!!
  - Under asymmetric information, there will be insufficient entry
  - What happens if the capacity can be shared and investors choose the scale of entry?
- With shared bargaining power the analysis would resemble the previous case
- Could the entrant buy the transmission right and resell it to the incumbent?
- Integration on the large retail market: the firm could use the right to foreclose entry?

Financial rights

- Right on the scarcity rent 1-p, where p is the nodal price.
  - Neutral to the outcome of Bertrand competition to supply 1
  - Provides insurance for the firm → case of early investment
- Perverse effect
  - The right generates value only if there is competition
  - Thus there is incentive to invest just to create competition
- This is a source if excessive investment → case of late investment, I always invest and E enters only if $G < c-d$, thus there is insufficient entry
- Early investment?
  - What if the price is adjusted to the policy of the firm so as to reflect the actuarial value ? Would the firm buy it?

Financial rights

- Why is the entrant not allowed to compete for the right?
  - If E has the right, then E will always enter (payoff 1-d-G), thus F doesn’t nvest
  - Thus E could use the right as a preemption tool
- Conjecture, if both compete for the right under symmetric information the most efficient wins between:
  - I invests and E enters if $G<m$
  - I doesn’t invest and E always enters
- If the supply of capacity of E is elastic, the monopoly owner of the right may manipulate its supply to generate a scarcity rent?

THANK YOU !