Sale of virtual capacity as a merger remedy

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- Or in the economist's language: Reputation effects

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- So, incumbent (merging) firm extracts the rents the virtual producers capture, and internalizes all industry profit
- We will show that if VPP's are used indefinetely (for a very long time) then in the long run the incumbent is able to sustain monopoly outcomes and extract monopoly profits from the market

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- With VPP this logic breaks down.

Worries about effect of VPP's, France

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- This is the mechanism we focus on here

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- My results confirm worry

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- However in 2007
  "*The DCA has investigated to what extent the VPP-auctions have influenced Elsam's actual market strength in the West Danish market and found that .... the VPP-auctions only to a very limited extent has reduced Elsam's possibilities for determining the price...*"

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- Lit on capacity-sharing or cotenancy. See, e.g. Baseman (1988), Gale (1994) and Rassenti et al (1994).

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- VPP option to buy at MC, so price for output in VPP

$$\sigma(q_v, \psi) = c(q_v, \psi) / q_v$$

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- *Proposition 1. A larger virtual capacity makes the static market more competitive. Furthermore, the virtual producers use all their capacity and their total expected profit is independent of how the virtual capacity is distributed.*

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- Incumbent's total profit

$$\Pi_0(q_v, r) = \pi_0(q_v) + \alpha(q_v, r)$$

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- In fact it works perhaps even better: Ensures productive efficiency
- If a particular plant had been divested, productive efficiency would not necessarily prevail.

Monopoly in the output market

- Monopoly profit

$$\pi^m(\varepsilon, \psi) = \max_q \; p(q, \varepsilon)\, q - c(q, \psi)$$

Expected monopoly profit π^m

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- "Almost" because of the risk premium
- The incumbent's trick is to reduce production and capture rest of monopoly profit through the auction

SPE, incumbent's output strategy

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- If $t = 0$, or only $\tilde{q}\left(q_v, \varepsilon, \psi\right)$ in past, t is a normal period, otherwise punishment period

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- In both types of periods, a VPP producer knows that he/she will receive no rents from future periods, so optimal to use all VPP

SPE, incumbent's no deviation constraint

- Normal period: Adhere to strategy: Sell $\tilde{q}\left(q_v, \varepsilon, \psi\right)$. Gives profit:

$$\tilde{\pi}\left(q_v, \varepsilon, \psi\right) = p^m\left(\varepsilon, \psi\right)\left(q^m\left(\varepsilon, \psi\right) - q_v\right) - \left(c\left(q^m\left(\varepsilon, \psi\right), \psi\right) - c\left(q_v, \psi\right)\right)$$

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$$\delta \geq \delta(\varepsilon, \psi) \equiv \frac{\pi_0(q_v, \varepsilon, \psi) - \tilde{\pi}(q_v, \varepsilon, \psi)}{\tilde{\Pi}_0^m(q_v, r) - \Pi_0(q_v, r) + \pi_0(q_v, \varepsilon, \psi) - \tilde{\pi}(q_v, \varepsilon, \psi)}$$

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Theorem

If $\delta \geq \delta\left(\bar{\varepsilon}, \underline{\psi}\right)$, there exists a sequential equilibrium, where in each period the market price and quantity are at the monopoly levels and the incumbent's expected total earnings equal $\tilde{\Pi}_0(q_v, r)$, i.e. the expected monopoly profit less the bidders required return on virtual capacity. If $r = 0$, then in this equilibrium the incumbent's expected earnings equal the expected monopoly profit, π^m.

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- From the point of view of the incumbent it is important that the virtual producers' behavior can be predicted. In the equilibirum, they are just selling as much as their capacity allows
- Barclay Capital (2005) in a report to the commission stated that this is exactly what is happening:
  "To provide effective competition, VPP positions must translate into active participation in setting wholesale prices. This requires VPP holders to have the option to "generate" or "not to generate" at or around the prevailing market price. However, our experience is that the strike prices (of VPP use, CS) .....are often so low as to make it virtually impossible for the option to "generate" not to be exercised."

A few more comments

- When there is no uncertainty crucial discount factor becomes

$$\delta > \delta|_{r=0} \equiv \frac{\pi_0(q_v) - \tilde{\pi}(q_v)}{(p^m - p(q_v))\, q_v}. \tag{2}$$

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- This is smaller, the longer duration of the contract. A longer contract therefore makes it more difficult to fulfill $\delta \geq .\delta\left(\bar{\varepsilon}, \underline{\psi}\right)$. Hence, a longer contract makes it more difficult to sustain the monopoly outcome.

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Theorem

Assume that $\hat{\delta} < \delta < \delta(\bar{\varepsilon})$. *Then there exists* ε^*, *where* $\underline{\varepsilon} < \varepsilon^* < \bar{\varepsilon}$, *such that the best sequential equilibrium for the incumbent involves*

$$\begin{aligned} \hat{q}(q_v, \varepsilon, \varepsilon^*) \ \text{for} \ \varepsilon &\geq \varepsilon^* \\ \tilde{q}(q_v, \varepsilon) \ \text{for} \ \varepsilon &\leq \varepsilon^* \end{aligned}$$

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- When demand is high, incumbent has to increase production so that a deviation is not more tempting than in state ε^*. This gives less profit than if he were able to maintain the monopoly outcome

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- If alternatively there is physical divestiture and Cournot punishment, then tacit collusion on monopoly outcome requires that $\delta > \frac{1}{2}$ even though the firms distribute output (and profit) with an eye to minimizing temptations to deviate
- Optimal punishments – complicated by the fact that firms are asymmetric.

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- If the horizon is relatively short and it is a temporary remedy, then much speaks for it
- If however it is a permanent remedy (as in DK power market) there are worries
- If the incumbent behaves rationally, then the pro-competitive effects of VPP's may be nullified - even though there are not coordinated effects and even though buyers of VPP behave competitively.