

Pricing, Investments and Mergers with Intertemporal Capacity Constraints

by

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The Model

- Duopoly
- Three (four) periods
 - Choose production capacity at time zero (for the next three periods)
 - Every period demand is 1
 - Valuation is unknown
 - Distribution is known $v \sim U[0,1]$
 - i.i.d. is known
 - Homogeneous product

Timing

One unit is demanded
 $v \sim U[0,1]$

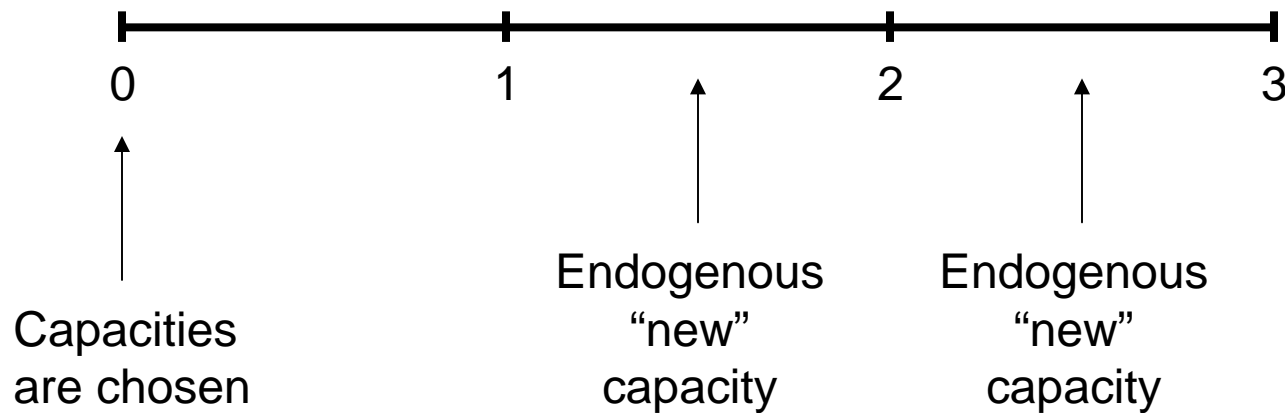
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Main results

- **Buffering:** Large firm has incentive to buffer low capacity firm... then act as monopolist (Dudey, 1992 QJE)
- **Option value of capacity:** When 'early period' customer has low valuation, there is an incentive to lose that order in the hope of selling tomorrow at higher price
 - Both firms think similarly → High prices
 - May lead to unrealized sale (which would never happen under monopoly – manages capacity better)
 - May reverse buffering
- **Capacity choice:** never excess capacity in eq.
- **Mergers:** the possibility of a merger results in larger capacity installed (to capture more of the merger profits) ... too much capacity (inefficient if costly) ...
- **Welfare implications of merger:** always transact... but possibly inefficient capacity – thus a trade off

Good

- Counter-intuitive results
 - Qualified buffering argument
 - Duopoly may be worse than monopoly
 - The possibility of mergers may lead to too much capacity investment
- Interesting first step towards a more general theory of pricing with intertemporal capacity constraints
 - Simple/clear model of a complex problem
- Really well-written

Questions

- What this is a model of?
 - Industry?
 - Not electricity
 - Not turbines
 - ???
 - Unknown customer valuation *but* known that period demand is 1
 - Which is more relevant?
 - Introduction talks about “low demand...” but no such thing in the model
 - No WTP correlation (period to period)
 - Might bring buffering back
 - One customer only but has no bargaining power
 - In addition, buyers are non-strategic
 - If does not buy... exits
 - Other assumptions:
 - Firms know each others' capacities
 - Firms know each others' costs
 - Homogeneous product
 - Unlikely to see excess supply (only if capacity is free)
- Not really motivated by phenomenon, but literature

Questions

- In the case that trade does not occur, how would things change if “revised” offers were possible?
 - Notice that part of monopoly advantage comes from this
- “Monopoly may be better than duopoly” ...but too much advantage to monopoly
 - Perfectly inelastic demand
 - How would welfare analysis change if demand downward sloping?
 - ...and funny disadvantage to monopoly... excess capacity investment *before* becoming a monopoly
- Firms are ex-ante identical, but ex post may be asymmetric, depending on costs
 - No way to tell who will be who
- No equilibrium in pure strategies when capacity cost is very low?
 - Not true if capacity cost is zero (Table 1, page 15)
 - Not so far-fledged, especially if sunk capacity and costless choice on how much to produce
 - ...qualifies some of the arguments on desirability of mergers
 - Proposition 2 says that with constant returns, firms never invest in excess capacity... Section 4 makes point that if merger is a possibility, then there is increased incentive to invest in capacity (better position in merger negotiations) leading to excess capacity

Questions

- Dynamic model but ...
 - Capacity choice committed (exogenously) at $t=0$... no so dynamic
 - Could have a fully dynamic model?
 - Capacities can be revised (after every three periods?)
 - Infinite horizon
 - Thoughts on what's lost from not having “fully dynamic” model?
- Why $t=3$?
 - What's “lost” if $t=2$ (which is much simpler)?
 - Why intuition of “revised buffering” does not use $t=2$ vs. $t=3$
 - What might be “gained” if $t=4$ (other than great complexity)?

Other questions

- How sensitive are welfare results to “surplus” sharing rule?
 - Are there mechanisms (gov’t being paid part of surplus, for instance) that fix the overinvestment problem?
- Given that introduction of uncertainty is new element... are there interesting comparative statics on uncertainty?
- Zero discount “without loss of generality.” Some results, however, seem to depend on this (or, at least, would be qualified)
 - If $\delta = \text{large}$, prices are always zero when orders are contested by both firms
 - When firms are myopic, mergers (monopoly) may be less desirable from total welfare maximization
 - No unrealized sales
 - No excess capacity