Buyer Power and the “Waterbed Effect”

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Motivation

- "Waterbed Effect": *If (non cost-related) price reductions to one set of buyers lead to higher prices for other buyers.*
- Logically consistent or accounting illusion?
- If logically consistent, then:
  - When strong, when weak?
  - Consumer harm?

Literature

- Majumdar (2005):
  - Formation of larger buyer reduces “scale of remaining business”. Makes it less attractive for potential upstream entrants.
  - Akin to “dynamic story”: Upstream exit / less entry.
- General literature: See Inderst and Mazzarotto (2006).

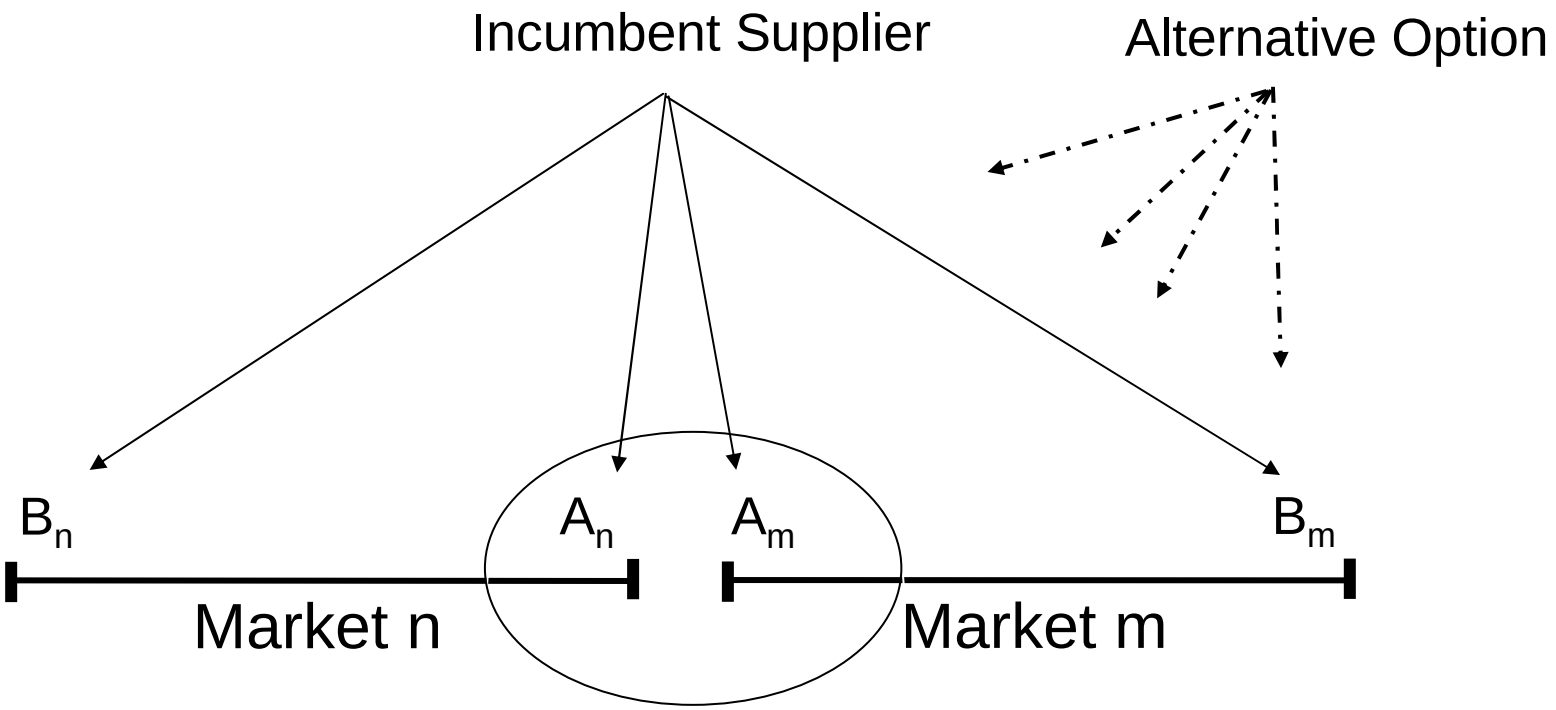
The Basic Model

- Markets and firms:
  - n=1…N symmetric markets. Each with two firms A_n and B_n.
  - For now symmetric own marginal costs c.
  - Linear wholesale pricing of supplier: $w(A_n)$, $w(B_n)$.
  - Supplier's own marginal costs k.
- Game: Supplier makes TOL offer.
- Outside option for buyers:
  - Switch at fixed costs F. Procure elsewhere with costs k+c.

The model (cont.)

- Price competition. Strategic complements.
- Standard assumptions on derived profit function π:
  - $\pi_1<0$. $\pi_{11}>0$.
  - $\pi_{12}<0$.
- Working example: Hotelling competition.

Illustration (Hotelling)



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Analysis with symmetric firms

- Participation constraints:
  1. $\pi(c+w(A_n),c+w(B_n)) \geq \pi(c+k,c+w(B_n))-F$
  2. $\pi(c+w(B_n),c+w(A_n)) \geq \pi(c+k,c+w(A_n))-F$

- Symmetric wholesale price w_I up in F.

- Hotelling:

$$w(A_n) = w(B_n) = w_I = k + 3t\left[\sqrt{1+2F/t} - 1\right]$$

Introducing Multiples

- One large buyer controls n_L firms.
- Three different equilibrium wholesale prices:
  - Large buyer w_L.
  - Competing small firms w_S.
  - Other independent firms w_I.
- The waterbed effect:
  - $w_L < w_I$ and $w_S > w_I$. However, different intuition!
  - Difference $w_S - w_L > 0$ is strictly increasing in F.

Retail Prices and Consumer Surplus

- Retail price of small firms affected by:
  - Waterbed effect: Up.
  - Increased competition (strategic complements): Down.
- Formally: $$\frac{dp_S}{dw_L} = \frac{\partial p_S}{\partial w_L} + \frac{\partial p_S}{\partial w_S}\frac{\partial w_S}{\partial w_L}.$$
- **Result:** *If the large buyer's discount is relatively small, i.e., if F is small, then all retail prices go down.*
  - First, "strategic complement" effect independent of F.
  - Second, waterbed effect goes to zero for low F.

Results for the Hotelling Model

- **Result 1:** *The waterbed effect dominates if*

$$y_S < \frac{1}{3t}(w_S - k)$$

- Here:
  - y_S is the market share of a small firm.
  - This is thus more likely to hold if F is large, i.e., if the price differential is already large.

Results (cont.)

- Consumer surplus: Marginal change w.r.t. discount w_L equal to marginal change in average price.

- **Result:** *Consumer surplus down if large buyer gets additional discount (implied by further growth) whenever*

$$2\,y_S\,\frac{2-y_S}{1+y_S} < \frac{1}{3t}(y_S - k)$$

- While stricter than previous condition, again more likely if small buyers already more “squeezed”.

Extension: “Organic Growth”

- The waterbed effect arises as well if:
  - Each buyer only controls one firm.
  - But size differences are due to different own marginal costs.
  - Growth = Increase in efficiency.

- Only difference: Welfare analysis.

Further Extensions

- Endogenous acquisition (Hotelling): Larger buyers have a higher willingness to acquire additional firms.
  - Can lever larger discount into new market.
  - Further input price differential dampens competition. (In contrast, to case where firms become more symmetric.)

- Nash Bargaining without “Outside Option Principle”:
  - Countervailing force: “Me-too” instead of waterbed effect.
  - Analysis loses tractability. For a special case we can show, however, that waterbed effect dominates for all sharing rules.

Summary

- Results:
  - Formal foundation for the waterbed, even with constant upstream market structure.
  - Potential for consumer harm, even without downstream exit.
  - Waterbed effect stronger and consumer harm more likely if smaller firms are already substantially disadvantaged.

- Caveats and next steps:
  - Reconsidering “full” bargaining case.
  - Alternative models/sources of buyer power.

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