

Buyer Power and the “Waterbed Effect”

Roman Inderst
University of Frankfurt
& London School of Economics

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).

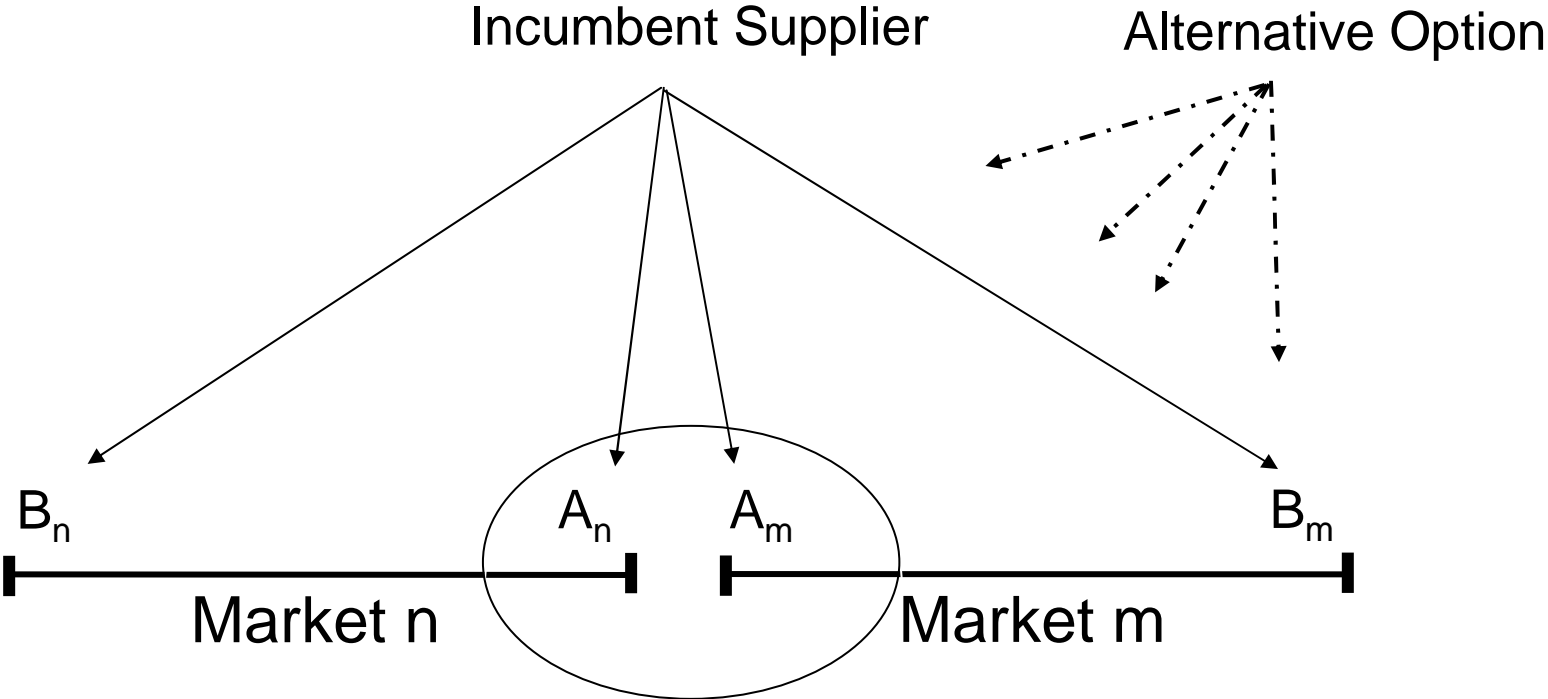
The Basic Model

- Markets and firms:
 - $n=1 \dots N$ 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)



Roman Inderst – Buyer Power and the Waterbed Effect

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.

Buyer Power and the “Waterbed Effect”

Roman Inderst
University of Frankfurt
& London School of Economics

Roman Inderst – Buyer Power and the Waterbed Effect