“Tacit” bundling among rivals: Limited availability bargains to loss-averse consumers

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Introduction

Retailers often offer deals that are subject to "limited availability" to boost their sales.

(early-bird discounts, limited-time deals, first come first served offers, etc.)

Bait and Switch

Bait and switch pricing to loss averse consumers

Loss aversion⇒ Individuals weight losses relative to a reference point more than they weight gains.

Bait ⇒ Such deals attract consumers' interest and create an attachment effect by defining their consumption reference point.

Switch ⇒ When the deal is not available, loss aversion leads them to ex-ante unfavorable purchases to avoid the disappointment of leaving the store empty-handed.

e.g. buy the product at a higher price
buy other (substitute) products

Introduction

Heidhues and Kőszegi (2014) ⇒ A monopolist commits to a price distribution, consisting of a sale and a high regular price. The sale makes consumers anchored to the idea of consuming the products. To avoid disappointment, consumers have a higher willingness to pay and end up buying the product even when the price is high.

Rosato (2016) ⇒ A seller announces a bargain price on a good that is subject to limited availability. He creates an attachment to consumption that allows him to extract consumer surplus via a high price on a substitute good (rip-off) when the bargain is not available.

Our analysis

- We introduce a bait and switch pricing model in a partially differentiated duopoly, where the joint consumption of the products is possible.
- Without any explicit exchange of information, sellers achieve to coordinate in high prices on their products and consumers still buy both products ⇒ **"Tacit" bundling**
- Expectation-based loss aversion hikes the prices of both products up relative to deterministic pricing.

Model

- 2 sellers A and B $\Rightarrow$ goods a and b (partially differentiated)

  marginal production cost $c \geqslant 0$

- unit mass of identical consumers

- intrinsic valuations: $v = (v_a, v_b, v_{ab})$,

  where $v_a \geqslant v_b > 0$

  $v_{ab} = v_a + v_b + z$ and $z < 0$ (partial substitutes)

Reference dependence (Kőszegi and Rabin 2006)

Overall utility = Actual utility + Gain-loss utility

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- Actual utility $= v_i - p_i$

- Gain-loss utility

$$\mu(x) = \begin{cases} \eta x, & \text{if } x \geqslant 0 \\ \eta \lambda x, & \text{if } x < 0 \end{cases},$$

where $\eta > 0$ is the weight attached to the extra gain or loss

$\lambda > 1$ is the coefficient of loss aversion

$x = (v_i - v^r)$ or $(p_i - p^r)$

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Reference points ⇒ a pair of probability distribution $F = \left(F_v, F_p\right)$

$$U\left[(v_i, p_i)|(v^r, p^r)\right] = v_i - p_i + \int_{v^r} \mu\left[v_i - v^r\right] dF_v(v^r) + \int_{p^r} \mu\left[p_i - p^r\right] dF_p(p^r)$$

Timing

- **t=0** $\Rightarrow$ Seller B announces and commits to $(p_b{}^s, p_b, q)$

  Consumers form their expectations about the purchase and choose a plan the maximizes their expected utility (PPE)

- **t=1** $\Rightarrow$ Seller A sets $p_a\,[p_b{}^s, p_b, q]$

- **t=2** $\Rightarrow$ Uncertainty is resolved and consumers execute their plans.

We assume no explicit collusion between the sellers.

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Given $({p_b}^s, p_b, q)$, consumers form rational expectations concerning their purchase and make a plan.

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Potential purchase plans:

$$\sigma \in [\{\oslash, \oslash\}, \{a, a\}, \{b, b\}, \{b, \oslash\}, \{b, a\}, \{ab, a\}, \{ab, b\}, \{ab, ab\}, \{ab, \oslash\}]$$

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In the case of multiple PEs

- **Preferred Personal Equilibrium** $\Rightarrow$

  $EU[\sigma] > EU[\sigma]$ for any σ snd σ'' that are PEs.

(Kőszegi and Rabin 2006)

Profit maximization problems

Seller B $\Rightarrow$ $\max_{{p_b}^s,\, p_b,\, q} \Pi_B\left[{p_b}^s p_b, q\right] = q\, {p_b}^s + (1-q)\, p_b \,- c$

s.t. $\sigma_{\,({p_b}^s,\, p_b,\, q)}$ is a PPE for consumers

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Deterministic Pricing

- For $c < v_b + z \Rightarrow \begin{cases} {p_a}^* = v_a + z \\ {p_b}^* = v_b + z \end{cases}$
- For $c > v_b + z \Rightarrow \begin{cases} {p_a}^* = (v_a - v_b) + c \\ \text{Seller B stays out of the market} \end{cases}$

Bait and Switch induces the joint consumption of the products

Potential Purchase plans

$\sigma : [\{\emptyset, \emptyset\}, \{a, a\}, \{b, b\}, \{b, \emptyset\}, \{b, a\}, \{ab, a\}, \{ab, b\}, \{ab, ab\}, \{ab, \emptyset\}]$

Bait and switch: Seller B $\Rightarrow \underbrace{\{b, b\}, \{ab, b\}}$, or $\boxed{\{ab, ab\}} \leftarrow$ **PPE**

Eliminated by market competition

p_a such that they are not PE (and therefore not PPE)

Equilibrium Prices

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- ${p_b}^* = (v_b + z) + \frac{2\,\eta\,(\lambda-1)\,q}{1+\eta\,(\lambda-1)\,q}\,{p_b}^s \Rightarrow$ Consumers are indifferent between $\{ab, ab\}$ and $\{ab, a\}$

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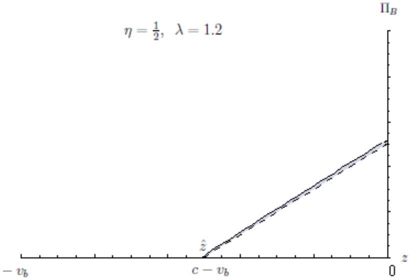
Consumers always buy both products

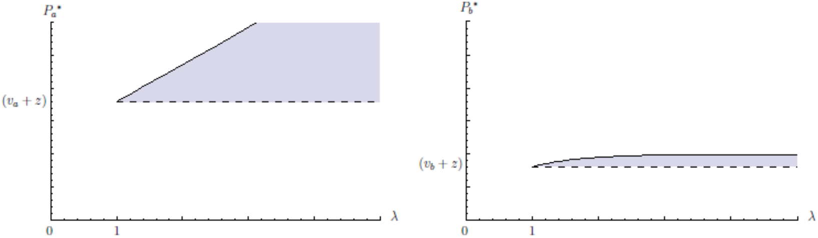
Bait and Switch vs Deterministic Pricing



Bait and switch is always preferred over deterministic pricing for relatively weak substitutes ($z \geqslant \hat{z}$).

Higher loss aversion makes bait and switch more likely.

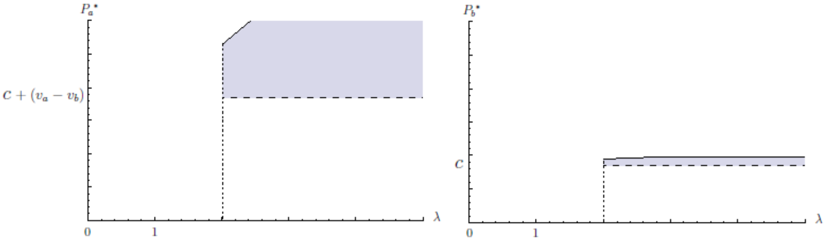
Bait and Switch vs Deterministic Pricing $(c < v_b + z)$



p_a* and p_b* are higher than under deterministic pricing

Tacit Bundling

Bait and Switch vs Deterministic Pricing $(c \geqslant v_b + z)$



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Tacit Bundling

Conclusions

- Bait and switch pricing under imperfect competition can be a mechanism that induces collusion between rival sellers without any explicit exchange of information.

- Even though prices of both the products are high relative to deterministic pricing, consumers always buy both products ⇒ Bundling

Thank you for your attention!