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Price Stability and Improved Buyer Utility with Presentation Design —a Theoretical Study of the Amazon Buy Box

Motivation

Buy Box

The screenshot shows the product page for an iPhone 16 Pro Max / 256GB / Black Titanium (SIM Free). It includes a large image of the phone, a summary section with a 4.4 rating, and a detailed description of the device's features like the A18 Pro chip, 48MP camera, and 6.7-inch Super Retina XDR display. The 'Buy Box' is highlighted with a red box, showing the price of \$1,439.99 and the 'Buy Now' button. Another red box highlights the 'Buy Box' text.

Amazon picks one **prominent** seller in the Buy Box. Can you spot the other sellers?

Prices can be **volatile** on Amazon.

This work: **prominence in presentation may help stabilize prices, but only with proper mechanisms.**

Model

A Market with Searching Consumers

- A unit-demand buyer chooses among m sellers.
- Seller i posts a price p_i visible to the buyer.
- Seller i 's product value $v_i \sim F$ is invisible.
- Buyer must pay **search cost** to learn v_i .
- Weitzman's index policy is the buyer's optimal search strategy.

A platform can pick a seller i and make him **prominent**: his search cost becomes 0.

A **prominence mechanism** maps sellers' posted prices to a choice of prominent seller.

Platform designs a prominence mechanism, sellers best respond with prices.

Equilibrium: seller's prices (p_1, p_2, \dots, p_m) such that

$$\text{Rev}(p_i, p_{-i}) \geq \text{Rev}(p'_i, p_{-i}), \forall i \in [m], p'_i$$

*Revenue = price \times probability of being chosen by the buyer.

{Our key findings}

- ✗ **[Theorem 1]** With search cost, no equilibrium exists if no seller is given prominence
- ✗ **[Theorem 2]** No equilibrium exists if the seller posting the *lowest price* gets prominence
- ✓ We study the range of equilibria inducible by properly designed prominence mechanisms
- ✓ As search cost increase, equilibrium price may decrease, and buyer surplus may go up

Prominence Mechanisms

{Dictator Mechanism} The platform fixes a threshold t ,

a seller i gets prominence only if $p_i = t$.

{Threshold Mechanism} The platform fixes a threshold t ,

a seller i gets prominence only if $p_i \leq t$.

Thm The Dictator mechanism can implement any symmetric equilibrium price inducible by any “natural” prominence mechanism.

Thm The set of symmetric equilibrium prices inducible by natural prominence mechanisms is an **interval** $[\underline{t}(c), \bar{t}(c)]$.
We characterize this interval.

Coroll This interval expands as search cost increases.

Thm The set of symmetric equilibrium prices inducible by threshold mechanism is also an **interval** $[\underline{t}(c), \bar{t}^*(c)]$.

Note: it can sustain the same lowest equilibrium prices as Dictator.

Social welfare decreases with search cost.

For many distributions, buyer surplus *increases* with search cost.
We give a sufficient condition for when this is not true:

$$f(V^+) < \frac{1}{13} f'(V^+).$$

Here are two examples for the two cases:

(left) when consumer surplus increases with search cost, and
(right) when it's not the case

