



*equal contribution



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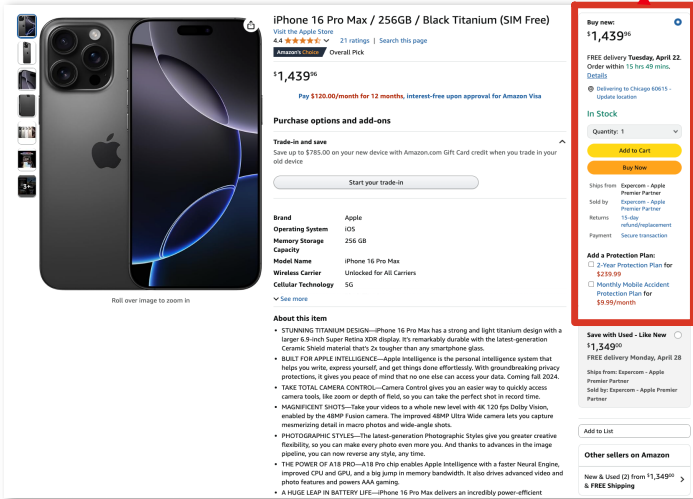
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Price Stability and Improved Buyer Utility with Presentation Design —a Theoretical Study of the Amazon Buy Box

Motivation

Buy Box

Model



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.**

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

