Sources of consumer information

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July 12, 2024

Product information

When buying an unfamiliar product, a consumer has access to multiple sources of information besides what the seller chooses to disclose.

However, the cost of obtaining and processing that information might induce the buyer to decide on purchasing or not on the sole basis of the information provided by the seller.

Setting

Product for which a buyer has unit demand with match value v drawn from a random variable with support $V = [\underline{v}, \overline{v}]$, $\underline{v} \leq 0$ $\overline{v} > 0$, cdf G, density g, and let $\mu \equiv E(v \mid v \geq 0)$.

Utility is $v - p$ if buyer buys at price p and zero if he does not buy.

Seller has zero marginal cost.

Match initially unknown (common prior given by G);

- Buyer can learn match perfectly at search cost s.
- Seller can provide product information to buyer.

Timing

1. Seller selects a disclosure policy, X, $V \to \Delta(M)$, where M is a set of signals, and a price, p.
2. Nature draws v.
3. Disclosure policy delivers signal m.
4. Buyer observes X, p and m and chooses whether to buy, search or drop.
    - if he searches then he chooses whether to buy or drop after observing v.

Presentation outline.

1. Description of optimal information disclosure by seller.
2. Description of profit maximizing solution and its welfare properties.
3. Explore whether buyer benefits from optimal information disclosure as opposed to relying on his own capacity to collect information.

Optimal information policy: an example

Disclosure policies *à la* Lewis Sappington (1994):

- $M = V$ and, for each v, $m = v$ with probability $\eta \in [0, 1]$ and m is drawn with distribution function G with probability $1 - \eta$.

Wang (2017): in our setting, for v uniform on $[0, 1]$, s small, seller chooses $p = \frac{1}{2}$ and $\eta = 1 - 2s$.

- consumer buys if $m > \frac{1}{2}$ and searches otherwise.

For larger s seller drops its price and discloses nothing: $\eta = 0$, so price is never above monopoly pirce $\frac{1}{2}$.

Idea of the *revelation principle*

Wang's outcome for s small can be replicated with $M = \{buy, search\}$ and a policy X defined by:

- if $v > \frac{1}{2}$, $m = buy$ with probability $\eta + \frac{1}{2}(1-\eta)$.
- if $v \leq \frac{1}{2}$ $m = buy$ with probability $\frac{1}{2}(1-\eta)$.

Now only two steps in the demand with the high step strictly above $\frac{1}{2}$.

In original policy for $m = \frac{1}{2}$ buyer indifferent between buy and search: now all who receive $m = buy$ strictly prefer buy.

IC constraints preventing buyer from searching or dropping are relaxed and price could be increased above $\frac{1}{2}$: however, demand from those who search would go down.

Beyond the revelation principle: deterring search

What matters for the seller is "whether buyer buys": so she could bypass the buyer's search by telling him whether he would end up buying or not.

Consider the policy where $M = \{buy, drop\}$,

- If $v > \frac{1}{2}$, $m = buy$ with prob. 1,
- if $v \leq \frac{1}{2}$, $m = buy$ with prob. $\frac{1}{2}(1-\eta)$.

Conditional distribution of $(v \mid buy)$ is even more favorable than in the straight application of the rev. principle, so both IC constraints preventing search or drop are relaxed.

Then price can be increased while maintaining the same probability of sale as in Wang.

See Matyskova and Montes (2022) for a search deterrence result in a different context.

Optimizing disclosure: threshold

In our second policy, there is some positive probability that $m = buy$ no matter how low the actual v is.

Posterior for a buyer getting signal *buy* can be made more favorable by bunching all the $m = buy$ signals on the high v values.

Total probability of buy in Wang is $\frac{1}{2} + \frac{1}{4}(1 - \eta) = \frac{3}{4} - \frac{\eta}{4}$.

Consider a policy where $m = buy$ iff $v > \tilde{v} = \frac{1}{4} + \frac{\eta}{4}$: the probability of a sale is kept unchanged but the IC constraints preventing search or drop are further relaxed.

Price can be increased up to $\frac{1}{2} + 2s$ without violating the IC constraints.

See Saak (2006) and Anderson and Renault (2006) for threshold results in related contexts.

Product information disclosure in practice.

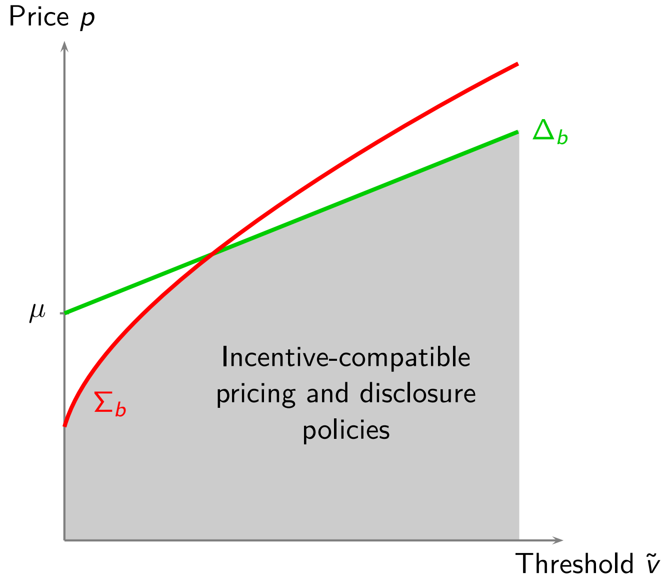
Information design assumes seller selects a distribution over signals for every value of v.

In principle, seller can do that without knowing buyer's tastes by disclosing some of its product's attribute.

This however, is constrained by taste distribution and the nature of product information that can be provided.

Platform can help through product steering or targeting based on consumer information.

Figure 1: Curves Σ_b and Δ_b



Characterization

Take s small enough so the no search IC binds.

- For s small, only the no search IC binds and price is inceasing in s.
- For high enough s both IC bind and price is decreasing in s.
- Threshold $\tilde{v}$ is decreasing in s so information of a buyer who buys deteriorates when search cost increases.

Welfare

As s increases, profit and social welfare increase while consumer welfare decreases.

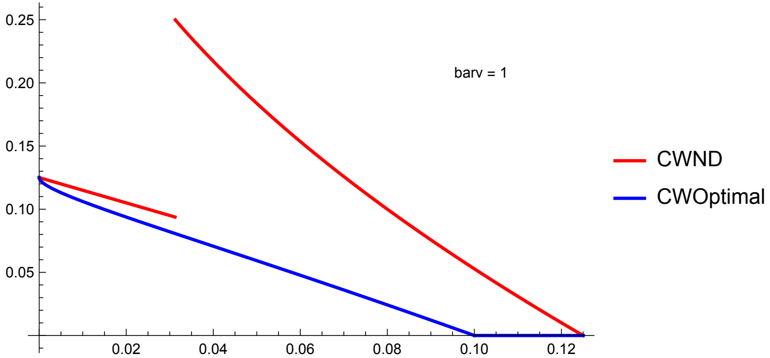
Impact of targeted information on buyer

Comparison of consumer welfare under optimal information disclosure and a no product information benchmark.

In benchmark, seller posts a price and buyer decides whether to buy, search or drop based on his prior on v.

- For s low, buyer searches;
- for s large, seller charges a low enough price so buyer buys without searching.

It is ambiguous whether buyer prefers targeted information to no information.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0.10
0.05
0.02
0.04
0.06
0.08
0.10
0.12
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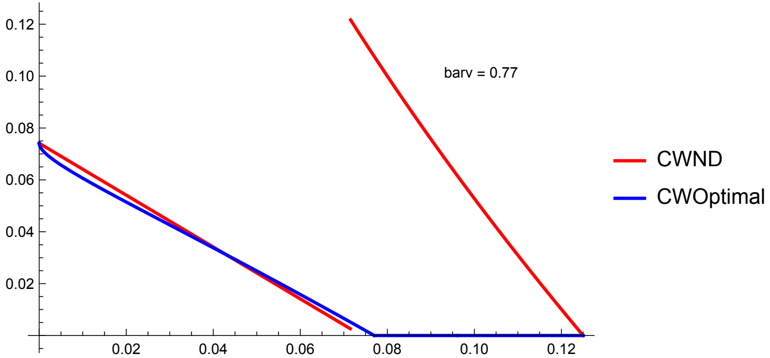
CWOptimal



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0.04
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0.02
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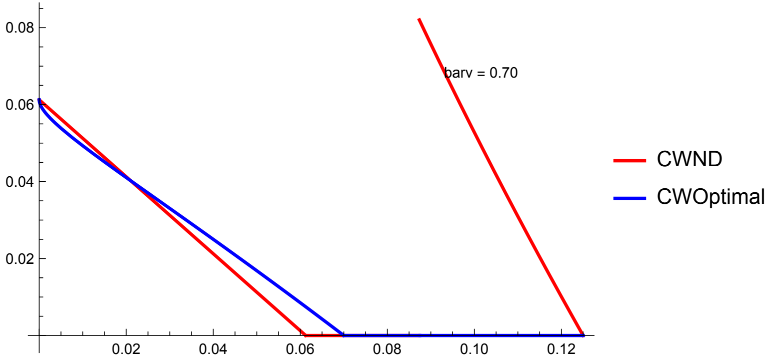
CWOptimal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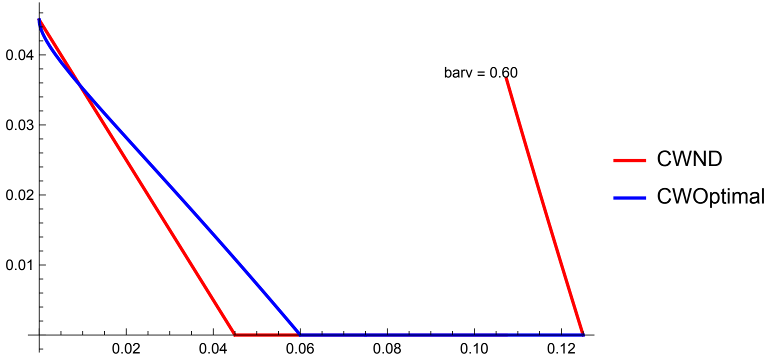
CWOptimal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CWND
CWOptimal
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0.03
0.02
0.01
0.02
0.04
0.06
0.08
0.10
0.12

Extensions

Reasons for search not being deterred completely

- Different consumers have different prior information.
- Different consumers learn different things when searching.