Dual Role Platforms and Search Order Distortion

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Introduction

- Dual role platforms:
    1. operate a marketplace, and
    2. also act as a seller.

- Examples:
    - Amazon, Google, Apple, JD for online.
    - Walmart, Target for both online and offline.

- Policy issue: *self-preferencing* behavior.

Self-preferencing:

- Platform's act of designing the marketplace in favor of its own products.

- Examples:
  - Search algorithm in Google.
  - Amazon's search algorithm and "Buy Box".
  - cf) Product assortment of private brands.

- Self-preferencing often takes a form of advantageous position in the search environment.

Introduction

Broad policy question:

- Is self-preferencing bad for consumers and societies?
- If so, how should we regulate it?

Research question:

- How does the prominence of a platform's product in search environment affect consumers?
- Do regulatory interventions that prohibit search order distortion work?

Introduction

Model overview:

- Price competition with sequential consumer search.

- Platform collect ad-valorem commissions from sellers.

- One seller is owned by the platform.

- Platform-owned seller is always searched first:
  - Later compared with the case of random search order.

Result overview:

- Search order distortion may *increase* consumer welfare, compared to random search order.

  $\rightarrow$ potential adverse effect of the neutrality regulation.

- Vertical separation always improves consumer welfare.

Related literature

- Consumer search: Armstrong et al. (2009); Zhou (2011); Armstrong (2017).

  - Our contribution:
    interaction between search order and commission revenue.

- Self-preferencing: de Cornière and Taylor (2019); Hagiu et al. (2020); Zennyo (2021); Hervas-Drane and Shelegia (2021)

  - Our contribution:
    self-preferencing modeled as advantagenous search order and its pro-competitive effects.

Model

Players:

- Two sellers M and T:
  - M is owned by a platform.
  - T is a third-party seller.

- Sellers pay an ad-valorem commission r to the platform.
  - Note: r is exogenous.

- Consumers sequentially search for the products by paying a search cost s.

- Search order distortion:
  consumers always search M first.

Consumer utility:
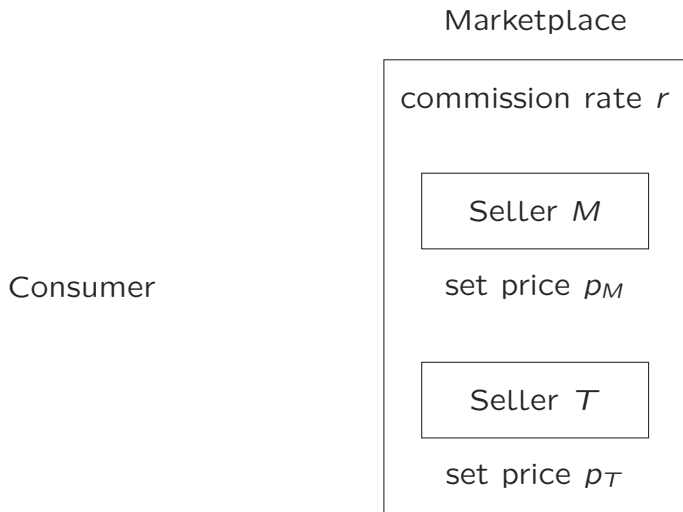
- Gross utility from a product i is

$$u_i - p_i.$$

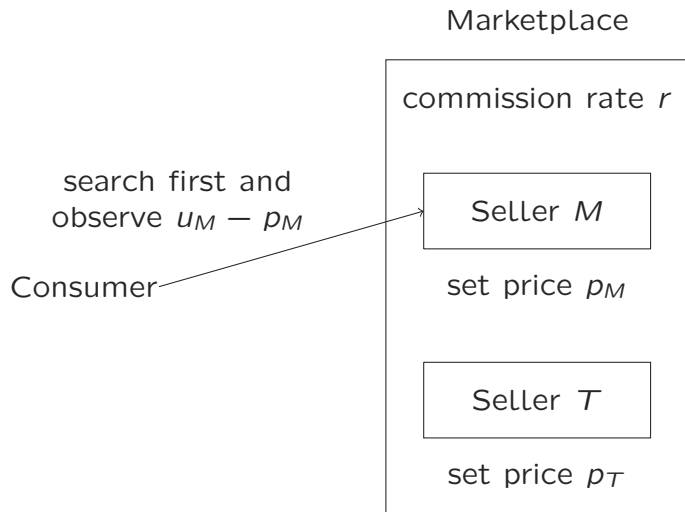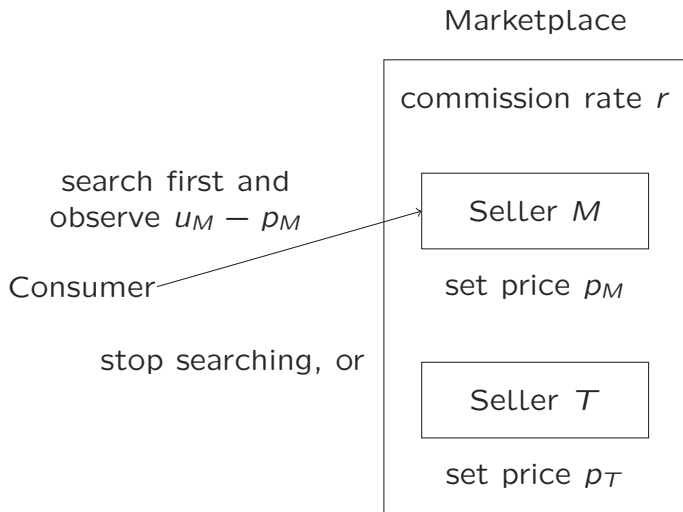- Consumers buys from one seller that the consumer has searched for.

Model

Marketplace

Consumer

Seller *M*

Seller *T*

Model

Marketplace

commission rate r

Seller M

set price p_M

Seller T

set price p_T

Consumer

Model

Marketplace

Marketplace

commission rate r

Seller M

set price p_M

search first and observe $u_M - p_M$

Consumer

stop searching, or

Seller T

set price p_T

Model

Marketplace

commission rate r

search first and observe $u_M - p_M$

Consumer

pay cost s and observe $u_T - p_T$
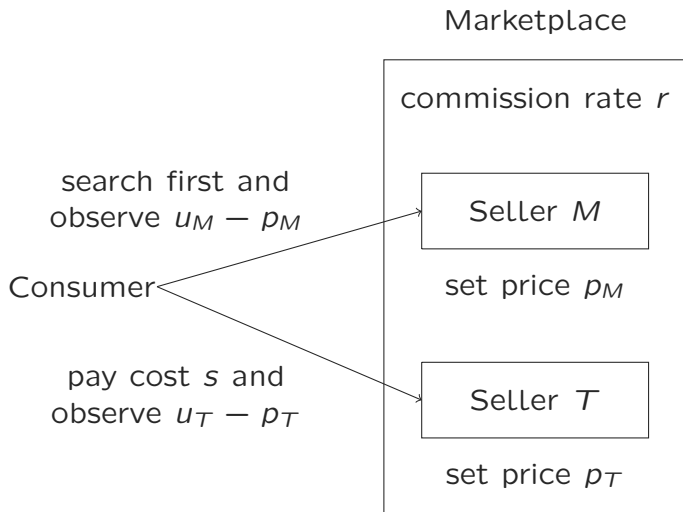
Seller M

set price p_M

Seller T

set price p_T

Model

Demand for each seller:

- The demand for seller M is given by

  $$D_M = \Pr(\text{immediately buys from } M)$$
  $$+ \Pr(\text{continues search but buys from } M)$$

- The demand for seller T is

  $$D_T = 1 - D_M.$$

Model

Seller's payoff:

- Seller M's profit is

$$\Pi_M = \underbrace{D_M p_M}_{\text{own product}} + \underbrace{r D_T p_T}_{\text{commission revenue}} .$$

- Seller T's profit is

$$\Pi_T = (1 - r) D_T p_T.$$

Model

Timing and equilibrium:

- Timing:
    1. Each seller independently set prices to maximize its own profit.
    2. Consumers engage in sequential search behavior and make a purchase decision.

- Equilibrium:
  perfect Bayesian equilibrium with passive belief.

Analysis

Main question:

Does the prohibition of search order distortion improve consumer welfare?

- To address question, we analyze the case of *random search order*.

- Consumers first search for each seller with equal probability.

- What is the effect of such policy?

Analysis

Two anticompetitive features in the model:

1. Search order effect:
   the asymmetric search order induces *market segmentation* and weakens the price competition.

2. Dual role effect:
   seller M sets a high price because it can earn revenue from seller T.

- 1. can be removed if we prohibit search order distortion.
- 2. might be exacerbated if we prohibit search order distortion.

Analysis

Main result in short:

1. When r is small, the prohibition of search order distortion
   1. lowers prices;
   2. improves total surplus; and
   3. improves consumer surplus.

2. When r is large, the prohibition of search order distortion
   1. raises prices;
   2. lowers total surplus; and
   3. lowers consumer surplus.

Why result reverses when r is large?

- Collusive effect of commission rate is significant under random search order.

- It is relatively small under search order distortion because the market is segmented.

- When r is large, this beneficial effect makes search order distortion welfare superior.

Analysis

Analysis
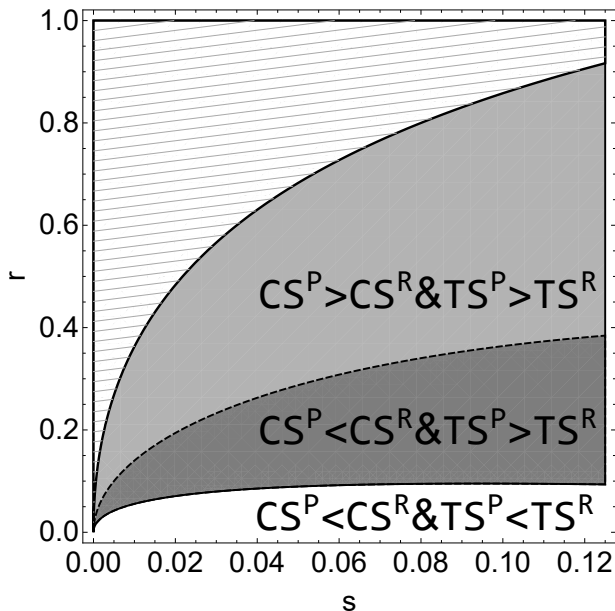
Vertical separation:

- Vertical separation requires seller M and the platform to be financially separated.

- In such a case, prices always become lower.

- If search order distortion is prohibited in such a situation, the price become further lower.

Summary:

- Search order distortion may be pro-competitive, especially when commission rates are high.

- In such a case, prohibiting search order distortion may have an adverse effect.

- Implication: unconditional prohibition of search order distortion is not a good policy.

- Vertical separation can always improve consumer welfare.

What is a policy implication?

- Unconditional ban of self-preferencing is not good anyway...

- Beneficial effects of search order distortion do not rely on
    - endogenous commission (Zennyo, 2021); or
    - quality choice (de Cornière and Taylor, 2019);

- Contrast with anticompetitive self-preferencing (Hagiu et al., 2020; Hervas-Drane and Shelegia, 2021):
    - difference in the substitutability.

Discussion

Is vertical separation better than neutrality regulation?

- In the model, YES.

- But a number of important elements make vertical separation unattractive...
  - e.g. Gilbert (2021).

- Case-by-case analysis would be necessary in practice.

Discussion

What is missing in our framework?

1. Endogenous business model (i.e., pure marketplace, hybrid, or pure reseller);

2. Platform's and sellers' investment decision.

3. Endogenous commission:
   - Partly addressed in the extension.

4. Other forms of self-preferencing:
   - asymmetric access to inputs (e.g. Kang and Muir, 2021);
   - abuse of data and imitation (e.g. Madsen and Vellodi, 2021).

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