

# Dual Role of the Platform and

# **Search Order Distortion**

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### 1 Outline

# 1 Introduction

# 2 Setup

- **3** Equilibrium characterization
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- **6** Conclusion
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### 1 Introduction (consumer search theory?)

Consumers often have incomplete prior information about the products they want.

Example: purchasing clothes



#### 1 Introduction

There has been a growing number of "*dual role* (or *hybrid*)" platforms that not only provide a marketplace but also act as a seller themselves.

• *e.g.*, **Amazon**, Google, JD, Walmart, and Target.

They sometimes engage in "self-preferencing" behavior.

**Self-preferencing(**自己優遇): the action of a firm to favor their own products over those of their competitors.

- This study is about the dual-role and self-preferencing behavior of platforms (mainly focuses on digital platforms).
- Here I first present some motivating examples.

### 1 Introduction (Self-preferencing example on Amazon)

In Sep. 2018, EU Commission has opened a formal investigation into Amazon's anti-competitive behavior regarding self-preferencing.

The selection of the winners of the "Buy Box."



Several studies found Amazon actually put its own-product to the box.

Even though those were not cheap (Angwin and Mattu(2016))

### 1 Introduction (Example of FBA user being Buybox winner)



Click image to open expanded view

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### 1 Introduction (Another example on Amazon)

Amazon further engages in self-preferencing behavior in the form of distorting search results.



### 1 Introduction (Other examples)

In 2017 and 2019, The EU Commission had fined Google for **promoting its own content** at the top of search results while demoting rivals (over **4.6 billion dollars**).

In Oct. 2020, the U.S. House Judiciary antitrust subcommittee concludes after a 16-month investigation as follows.

"Evidence shows that once Google built out its vertical offerings, it introduced various changes that had effects of **privileging Google's own inferior services** while demoting competitors' offerings."

#### 1 Introduction (Act, Guideline, etc..)

- Digital Markets Act (2021, EU); American Choice and Innovation Online Act (2021, US)
  - Prohibit platforms (gatekeepers) from favoring the platform operators' own contents (products, services, or businesses).
- 关于平台域的反断指南 (the Anti-Monopoly Guidelines) (2021, China)
  - Defined discriminatory treatment, such as the imposition of differentiated standards, rules, or **algorithms**, as an abuse of dominant position by the platform.
- Other relevant documents
  - Furman report (2019, UK); Crémer report (2019, EU); Cabral et al. (2021, EU); Wakui (2021, Japan); etc...

### 1 Introduction (cont'd)

As in the examples above, the dual role platforms often engage in this sort of self-preferencing behavior that **distorts consumers' information search behavior**.

- Specifically, they distort consumers' search order to promote a particular product (usually their own).
- "Own-content bias" (De Corniere and Taylor (2019); Zennyo (2021); Shelegia (mimeo))

#### **Research Question**

How does the self-preferencing such that distorting consumer's search order affect market outcomes? In what cases is it anti-competitive? What competition policy is preferable?

Purpose of this study: (i) reveal the impacts of the dual role platform's search order distortion on market outcomes and (ii) obtain the policy implications.

### 1 The model (outline)



Extension of AVZ (2009) (no platform in their model)

### 1 Findings and Contributions

#### Main findings:

- The platform may have an incentive to steer consumers to search its firm first.
- Such search order distortion weakens the price competition.
  - > distortion's pro-competitive effect < anti-competitive effect</p>
  - > commission rate ightarrow ⇒ anti-competitive effect ightarrow.
- A perfect separation policy can improve welfare.
- A policy that only prohibits the distortion may partially improve or harm welfare (depending on search costs and commission rate).

#### **Contributions:**

Provide policymakers and authorities with practical policy implications about the dual role platform behavior.

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### 2 The model (outline)



### 2 Demand (outline)

We first focus on the case where the platform steers consumers to visit **its own firm** M first (the search order distortion scenario).



Fresh consumers are more price elastic.

#### 2 FOCs with search order distortion

Given the commission rate r, each firm's profit function is given as follows.

#### Profit for firm N:

$$\pi_N = (1 - r) p_N D_N. \tag{1}$$

Profit for the platform:

$$\pi_P = p_M D_M + r \frac{p_N^P D_N^P}{N}.$$
 (2)

> The platform sets  $p_M$  to maximize the (partial) joint-profit.

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#### 3 Price characterization

Let superscript P denotes the case where the platform steers consumers to "**P**"latform's own firm first.

Proposition 1 (i) both  $p_M^P$  and  $p_N^P$  increase in the commission rate r; (ii)  $p_M^P$  increases more with increasing r than  $p_N^P$ ; (iii) There exists  $\overline{r}^P$  s.t.  $p_M^P > p_N^P$  for  $r > \overline{r}^P$  and  $p_M^P < p_N^P$  for  $r < \overline{r}^P$ .



### 3 Price characterization (2)

#### Intuitions:

- ▶ for small r: the platform focuses on firm M's revenue and has a strong incentive to lower p<sub>M</sub> to attract "fresh" consumers.
  - > the *distortion's* pro-competitive effect.



### 3 Price characterization (3)

#### Intuitions (cont'd):

- for not small r: the platform has an incentive to set a higher price to achieve higher revenues from firm N.
  - > the platform can use firm M as a commitment device.
  - > the *dual role's* anti-competitive effect.



#### 3 Price characterization (4)



	x = 0.6	x = 0.9	Max
	(s = 0.08)	(s = 0.005)	(s = 0.086)
$\bar{r}$	0.171	0.082	0.172



- Note: Amazon charges 8% to 15% for most of categories.
  In many cases, p<sup>P</sup><sub>N</sub> > p<sup>P</sup><sub>N</sub> will hold (r > r̄).
  - > A stark contrast to the previous studies.
  - >  $p_M < p_N$  in AVZ (2009);  $p_M = p_N$  in Zennyo (2020).

#### 3 Characterizations (cont'd)

おまけ: Suppose that the market is not fully covered (i.e., some consumers may not buy anything). Then,

Consumer surplus and the total transactions decrease in r.

The higher the commission r, the weaker the price competition (all prices soar), so more consumers do not buy anything.



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#### 4-1 Policy implications

Many reports and studies recommended the following measures against the dual role platform's anti-competitive behavior.

- 1 Structural separations;
- 2 Nondiscrimination requirements.

Here we consider three scenarios corresponding to the recommendations and compare the results.

- Perfect separation (radical)
  - > 1+2: vertical separation + random search order;
- Prohibition of search order distortion (mild)
  - > only 2: vertically integrated platform + random search;
- (Integrated platform+ordered search based on price expectations) (almost the same results as scenario 2).

#### 4-1 Perfect separation scenario

Structural separation + nondiscrimination (randomized order) scenario



The symmetric equilibrium price  $p_0$  is independent in r.

### 4-1 Perfect separation scenario (2): prices

#### (a part of) Lemma 2

Under the perfect separation policy, the symmetric equilibrium price is always lower than both prices in the baseline model.



Firm *N*'s demand consists of more fresh demand compared to the distortion scenario  $\Rightarrow$  price competition  $\nearrow \& p_0 \searrow$ .

• Note:  $p_M < p_0 < p_N$  always holds in AVZ.

### 4-1 Perfect separation scenario (3): welfare

#### (a part of) Proposition 2

Total surplus of the search order distortion scenario is always lower than that of the perfect separation scenario.

#### A perfect separation policy can improve the welfare!!

#### Intuition (no need to understand!!):

- Under the full coverage setting, consumer payment is a pure transfer. So only the match efficiency matters.
  - > Match efficiency: the match quality minus the search cost.
- The match efficiency depends on the price difference, and the uniform pricing is the most (socially) efficient.
- The price difference induces suboptimal search behavior (it makes people (i) more likely to stay if they should go to search, and (ii) those who do go are more likely to end up in waste)
  - Search order distortion impairs the search efficiency through distorting price competition (yielding price difference).

#### 4-1 Perfect separation scenario (4): welfare (2)

Note: when the market is **not** fully covered, the distortion also reduces total transactions (through an increase in prices) and results in severe welfare losses.

In the setting, a perfect separation policy will work very well.
 Besides...(in progress)

#### (a part of) Proposition 3

Consumer surplus of the search order distortion scenario is lower than that of the perfect separation scenario.

This result also holds when the market is not fully covered.

Note: a policy with only vertical separation (while allowing for a search-order distortion) may yield almost the same result (a price difference impairs match efficiency) (cf. AVZ(2009)).

#### 4-2 Prohibition of the search order distortion

Vertical integrated firm + nondiscrimination scenario



We also consider the situation such that consumers search based on price expectations with no full coverage setting (the results are almost same).

#### 4-2 Prohibition of the search order distortion (2): prices

Let superscript R denotes the case where the search order is "**R**" and omized.



We have the following arguments (similar to the baseline scenario): (i) both prices increase in the commission rate r; (ii)  $p_M^R > p_N^R$  for any r > 0; (iii) the price difference  $\Delta^R = p_M^R - p_N^R$  increases in r and s; (iv)  $p_M^P > p_M^R$  and  $p_N^P > p_N^R$  for r = 0. 4-2 Prohibition of the distortion (3): price comparison

**Comparison (prices) (** $p_i^P = Baseline$ ,  $p_i^R = Randomized$ **):** 



When s is not small, a prohibition of search order distortion can lower the prices (orange line<blue line) for small r.</p>

Such a prohibition would trigger firm N to charge a low price, encouraging price competition (this effect becomes dominant for small r).

### 4-2 Prohibition of the distortion (4): price comparison (2)



- However, when s is small enough and r is not sufficiently small, p<sub>i</sub><sup>P</sup> (blue line) tends to be lower than p<sub>i</sub><sup>R</sup>.
- The anti-competitive effect of dual role is strengthened as r increases, and the effect is stronger in the prohibition scenario.
  - > Relatively large share of firm N in the scenario.
  - Moreover, (1) the distortion's pro-competitive effect will cause the platform to set a very low price (because of small s);(2) the distortion will be a commitment to set such a low price.
- The prohibition policy may further soften price competition.

4-2 Prohibition of the distortion (5): welfare comparison

• Let 
$$TS^k$$
 be the total surplus for  $k = \{P, R\}$ .

#### Proposition 2

There exists a critical value of the commission rates  $r^{TS} \in (0, \bar{r})$  such that (i)  $TS^P < TS^R$  for all  $r \in [0, r^{TS})$  and (ii)  $TS^P > TS^R$  for all  $r \in (r^{TS}, \bar{r}]$  for any s.

- (In progress) this result may also hold for  $r > r^{TS}$ .
- (Numerically confirmed) the argument will also be valid in a situation where the market is not fully covered (fewer transactions through increasing both prices).

### 4-2 Prohibition of the distortion (6): welfare comparison (2) |31



Intuition is almost the same as at the price comparison.

- For small r, a prohibition triggers firm N to set a lower price, encouraging price competition and improving match efficiency.
- > As r increases, both prices rise more steeply in the prohibition scenario, leading further price difference and match inefficiency.

▶ Note:  $r^{TS} \rightarrow 0$  for sufficiently small s ( $TS^P > TS^R$ ).

e.g., e-commerce platform

#### 4-2 Prohibition of the distortion (6): welfare comparison (3) $|_{32}$

- Here we focus on the case where s is small enough.
- Let  $CS^k$  be the consumer surplus for  $k = \{P, R\}$ .

• Suppose 
$$s = \frac{\epsilon^2}{2}$$
 and  $r = \theta \epsilon$ .

#### Proposition 3 (in progress for moderate s)

(i) When  $\theta > 1$ , there exists  $\underline{\epsilon} > 0$  such that the search order distortion improves consumer surplus for all  $\epsilon < \underline{\epsilon}$ ; (ii) conversely, when  $\theta < 1$ , there exists  $\underline{\epsilon} > 0$  such that the search order distortion reduces consumer surplus for all  $\epsilon < \underline{\epsilon}$ .

- When s is small enough, a policy that prohibit search order distortion may reduce consumer surplus unless r is small enough.
- Note: when θ > 1 (r is not small), we can see that the search order distortion also improves total surplus !

#### 4-2 Prohibition of the distortion (6): welfare comparison (3) |32



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### 5 Conclusion

In this study, we investigated the impact of the search order distortion by the dual-role platform. We found

- The platform may have an incentive to steer consumers to search its firm first to weaken the price competition.
  - > The larger Ad valorem commission, the weaker the price competition.
- A structural separation policy can improve welfare;
- A policy that only prohibits the distortion may partially improve or harm welfare.
  - because the policy also eliminates distortion's pro-competitive effect, so we need to be careful when search cost is small or commission rate is not sufficiently small.

**Future plan**: derivation of the optimal commission rate *r* for each scenario and compare the results.

Thank you

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