Platforms under Joint Ownership

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Motivation

- In several industries with network effects, platform owners operate multiple similar platforms.
- Online hotel reservations: Booking Holdings owns platforms Booking.com and Agoda
  Matchmaking markets: ParShipMeet Holding operates the platforms Parship, eHarmony, and Elitepartner
  Online real estate: Zillow acquired Trulia, and kept both platforms active.

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  Online real estate: Zillow acquired Trulia, and kept both platforms active.
- (Positive) cross-group network effects should favor a single platform to become the go-to place
- Aim of this paper: Develop a theory that provides a rationale for an owner to operate several undifferentiated platforms

Main Idea

- Single platform: Owner must charge the same tariff to sellers; buyers do not pay to the platform
- Operating multiple platforms allows the owner to distinguish between single-homing and multi-homing sellers
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- Total surplus with two platforms may be *lower* but owner can capture a *larger* share
- Strategy of operating two platforms can be *welfare-increasing* or *welfare-decreasing*

Related Literature

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  Gomes & Pavan (2016); Lin (2020); Jeon, Kim & Menicucci (2022)
  Price discrimination on a single platform
- Tipping of platform markets
  Ellison & Fudenberg (2003); Ellison, Fudenberg & Möbius (2004); Karle, Peitz & Reisinger (2020)
  Competition between platforms

The Model

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- Single platform owner who decides whether to operate one or multiple platforms
- With multiple platforms, buyers and sellers decide whether to participate, single-home, or multi-home; platform owner observes sellers' listing decisions

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- Single platform owner who decides whether to operate one or multiple platforms
- With multiple platforms, buyers and sellers decide whether to participate, single-home, or multi-home; platform owner observes sellers' listing decisions
- Owner charges listing fee(s) to sellers; buyers can join for free.
- With one platform, owner charges a single price p_a to sellers.
- With multiple platforms, owner can charge two prices, p_a^{sh} and p_a^{mh}, where p_a^{sh} is the price of a single-homing seller and p_a^{mh} that of a multi-homer.

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- (Gross) surplus of a seller is $v_a + \alpha D_b$, where $v_a \geq 0$, and D_b is the mass of buyers with whom the seller interacts.
- A fraction λ_a of sellers are of type α_H and a fraction $1 - \lambda_a$ of type α_L.
- Sellers' outside option normalized to zero

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- (Gross) surplus of a seller is $v_b + \beta D_a$, where v_b is either stand-alone utility or opportunity cost and D_a is the mass of sellers with whom the buyer interacts.
- A fraction λ_b of buyers are of type β_H and a fraction $1 - \lambda_b$ of type β_L.
- Costs for joining each additional platform (but the first one) is f_b

The Model

- Timing:
  - Stage 1: Owner decides about the number of platforms and sets the listing fee(s), which may be conditional on a seller's homing decision
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  - Stage 1: Owner decides about the number of platforms and sets the listing fee(s), which may be conditional on a seller's homing decision
  - Stage 2: Buyers and sellers learn their type and decide whether and on which platform(s) to be active
- With more than one platform, there can be multiple equilibria in the second stage.
  Focus on the equilibrium in which the same number of buyers of each type is active on each platform
- Assumption: $v_b + \beta_H > 0$

One versus two platforms

- With single platform, four different market configurations:
  - (i) both types of buyers and sellers are active;
  - (ii) only the high-type sellers are active, but both types of buyers;
  - (iii) only the high-type buyers are active, but both types of sellers;
  - (iv) on each side, only high-type users are active.

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- Two platforms:
- In any equilibrium, high-type sellers are active on both platforms, whereas half of the low-type sellers are active on platform 1 and the other half on 2.
- Possible equilibria:
  - (a) only high-type buyers are active with half on each platform;
  - (b) all buyers are active and half join either platform;
  - (c) all buyers are active with high-type buyers joining both platforms while half of low-type buyers join either platform.

One versus two platforms

Proposition 1 *There exists a convex set of parameters* $(\lambda_a, v_a, \alpha_H, \alpha_L, \lambda_b, v_b, \beta_H, \beta_L, f_b)$ *with a non-empty interior such that the equilibrium profit with two platforms is strictly larger than with one platform.*

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- With one platform, cross-group network benefits from buyer participation are larger.
- But: owner can only charge a single fee.

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Main trade-off:

- With one platform, cross-group network benefits from buyer participation are larger.
- But: owner can only charge a single fee.
- When operating two platforms, owner obtains a larger revenue from a multi-homing seller than from a single-homer.
- This price discrimination possibility can tilt the market structure in favor of two platforms.

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  $\Rightarrow$ High type receives a relatively large net surplus
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- λ_a slightly below $\bar{\lambda}_a$
  With one platform, only high-type seller is active.
  $\Rightarrow$ Full surplus extraction but limited value creation
  With two platforms, owner brings low-type seller on board
  $\Rightarrow$ possibility of *greater* value capture leads to *larger* creation of surplus

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Consequence:

- Under some conditions, the owner operates 2 platforms, although 1 would be socially optimal
- Reverse never occurs
- Reason: with 2 platforms, some buyers single-home and do not trade with all active sellers

Welfare

- There are regions at which the privately optimal number and the constrained socially optimal number of platforms coincide.
- Dependent on the parameter range, a single or two platforms can be socially optimal.
- Therefore, optimal regulation depends on the concrete situation.

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- In a symmetric equilibrium, high-type sellers multi-home and pay the listing fee twice, whereas the low-type sellers single-home and pay the listing fee only once.
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- This allows again for differential pricing.
- Range is more narrow as fees are less sophisticated.

More than two platforms

Fixed set-up cost $F \geq 0$ per platform.

Proposition 4 *If $\lambda_a \alpha_H \leq \alpha_L$, operating a single platform is profit-maximizing.*
Instead, if $\lambda_a \alpha_H > \alpha_L$, the profit-maximizing number of platforms n^* is given by

$$n^* = \frac{1}{2}\left(1 + \sqrt{1 + \frac{4\lambda_b\left(\lambda_a \alpha_H - \alpha_L\right)}{F}}\right).$$

More than two platforms

- Although there are only two types, more than two platforms can be optimal.
- Why? Single-homing buyers are distributed over more platforms.
  $\Rightarrow$ Single-homing becomes less attractive to sellers
  $\Rightarrow$ Owner can leave a smaller surplus to high types.
- Effect dominates if the profit with only the high type being active is larger than the profit with both types being active.

Conclusion

- Paper provides a rationale why a platform owner operates several similar platforms, despite cross-group network effect.
- Theory is based on the idea that distinguishing between single- and multi-homers allows for better *capture of value*.
- Operating two platforms can increase or decrease welfare.
- Result holds with linear and non-linear fees.