

Competition and Advance-Purchase Behavior

The effect of platform transaction fees

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What the proposal is about?

- Advance-purchase discounts (APD): *Buying earlier is cheaper.*
- Competition enhances advance purchases and increases the mismatch of hotel-customer.
- Platforms can reduce advance purchases by changing the fee structure.
- Who gains? Consumers? Hotels? Platform?
- An empirical test of theoretical predictions.

Plan

Motivation

Theory

The Empirics Design

Summary

Advance-purchase discounts

- The simplest case:

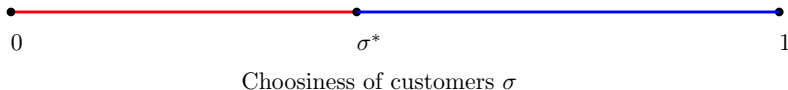
$$\begin{array}{c|c} t = 1 & t = 2 \\ p_1 & p_2 \quad (p_2 > p_1) \end{array}$$

- Consumers face uncertainties.
 - Uncertainties exist at $t = 1$, and are resolved at $t = 2$.
- Consumers have different expected values *ex ante*.
 - Some may have more uncertainties.
 - Some are more choosy: suffer more by picking the wrong date/hotel.

Advance-purchase discounts

the less choosy purchases at $t = 1$ at p_1

the more choosy purchases at $t = 2$ at $p_2 > p_1$



The effect of competition

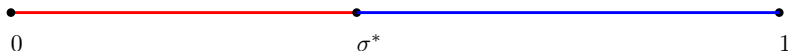
- Under competition, hotels are reluctant to leave customers to $t = 2$.
 - may lose the customer to other hotels
 - poach customers while still uncertain about their preferences
 - inter-temporal business stealing
- Compare to a monopolist, competing hotels will lower p_1 and have more advance purchases.

The effect of competition

Monopoly

the less choosy purchases at $t = 1$ at p_1

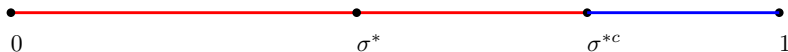
the more choosy purchases at $t = 2$ at $p_2 > p_1$



Competition

the less choosy purchases at $t = 1$ at p_1^c

the more choosy purchases at $t = 2$ at $p_2^c > p_1^c$



Choosiness of customers σ

The effect of competition

- Hotels suffer losses
 - more advance sales which have lower prices
- The platform suffer losses
 - less fees are extracted from sales
- Buyers may also suffer losses:
 - mismatch to less favorite hotels

Why does this matter for Booking.com?

- When hotel rooms are marketed through a common platform, platform fees may have an influence on the way hotels compete.
- Fees may affect the inter-temporal allocation of sales, i.e. the ratio of advance purchases to overall bookings.
- Understanding the effect of fees on the prevalence of advanced selling and spot selling is crucial for platform revenue.

Theory - A brief overview

- Model of two-sided market based on advance purchase framework of Möller and Watanabe (2016).
- Players: A monopolistic platform, several competing hotels, heterogeneous consumers with uncertain preferences.
- Timing of events:
 1. Platform sets fees for advance and spot reservations.
 2. Hotels choose prices for advance and spot reservations.
 3. Consumers choose between hotels and booking options.

Conjectures from theory

- Advance purchases are more prevalent in more competitive environments, independently of the transaction fees imposed.
- Percentage fees exacerbate the inter-temporal business stealing problem.
- A higher fee on advance reservations may have a positive effect on platform revenue and hotels' profits.

Limitations

- Quantity effects:
 - Consumers' utility from staying at some hotel is so high that, in equilibrium, the market is covered.
- Capacity issues:
 - Hotels' capacity is sufficiently high so that, in equilibrium, rationing never occurs.
- Platform competition:
 - Hotels' outside option is assumed exogenous.

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Two hypotheses

- Hypothesis 1: Competition.
 - Competition leads to more prevalence of advance sales.
- Hypothesis 2: Platform fees.
 - Fees influence the ratio of advance and spot sales.

The main regression

$$Y = \beta_1 \times \text{Comp} + \beta_2 \times \Delta\text{Fee} + X' \delta + \epsilon$$

Variables

- Y : 1 if the sale is in advance, 0 otherwise.
- Comp : a competition proxy.
- ΔFee : the fee difference between advance and spot sales.
- X : other reservation/hotel characteristics.

Required data

- A selected sample of reservations
 - reservation type (advance or spot sale), price, days in advance
 - room/hotel characteristics (such as location, number of beds, and stars).
 - fees charged by booking.com (optional)
- Carefully picked cities and date ranges to explore some natural experiments

The main regression

$$Y = \beta_1 \times \text{Comp} + \beta_2 \times \Delta\text{Fee} + X'\delta + \epsilon$$

Exogeneity

$$\mathbb{E}[\epsilon | \text{Comp}, \Delta\text{Fee}, X] = 0 \quad (1)$$

- marketing strategies of hotel managers influence both ΔFee and Y (uncontrolled confounding variables)
- measurement error on competition
- estimates are inconsistent

Instruments for ΔFee

- Fees are not exogenous.
 - bargaining between hotels and Booking.com
 - hotels can buy higher ranks by paying higher fees
- Use exogenous characters of hotels as instrumental variables.
 - For example, if number of rooms is one key determinants, then it can be used as an instrument.

Exogenous shocks for Comp

- Demand shocks or Supply shocks to the hotel market.
- Shocks only affects Y through “competition”, but not through other (uncontrolled) factors that also influence Y .



Supply shocks for Comp

Barcelona controls its Airbnb market

- Barcelona removed 2,577 listings from Airbnb in May 2018.
- Barcelona officials got access to the Airbnb data in June 2018.
- This is more likely to affect the competition for ≤ 3 -star hotels than luxury hotels.

Supply shocks for Comp

Identification strategy

Table: Fraction of advance sales

| dates/stars | ≤ 3 -star | > 3 -star | difference |
|-----------------|----------------|-------------|------------|
| before May 2018 | 0.52 | 0.63 | -0.11 |
| after June 2018 | 0.41 | 0.59 | -0.18 |
| difference | 0.11 | 0.04 | 0.07 |

Supply shocks for Comp

Regression analysis

$$Y = \beta_1 T + \beta_2 Stars + \gamma Stars \times T + X' \delta + \epsilon$$

- Y : 1 if the reservation is advance, and 0 otherwise.
- T : 1 if the reservation is before May 2018, and 0 otherwise.
- γ measures the effect of competition on Y .

Is it safe to visit Hong Kong?



Save



Demand shocks for Comp

Hong Kong protests

- the Hong Kong anti-extradition bill protests since June 2019
- It leads to a drop in aggregate demand for hotel rooms and intensifies competition
- According to our theory, there should be a surge in advance selling.

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Summary

- Competition leads to more advance sales due to the inter-temporal business stealing.
- This can lower the overall surplus.
- Platform fees can influence business stealing behavior, and hence may increase social surplus and hotel/platform profits.
- Require data only on the sellers side of transactions.

Thank you.

Your comments are much appreciated.