

Competition and Advance Purchase Behavior

The effect of platform transaction fees

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Hotel-Pricing

- Hotel rooms can be purchased in advance (**no-money-back**) or on the spot (**free-cancellation**).
- **Trade-off**: No-money-back offers discounts but free-cancellation guarantees flexibility.
- As consumers value flexibility differently there is scope for **inter-temporal price-differentiation**.

The Effect of Competition

- Hotels compete by choosing prices *and* advance purchase discounts.
- Möller and Watanabe (RAND 2016) show that advance purchases are more prevalent in more competitive environments.
- Hotels engage in inter-temporal business stealing: Poach customers while still uncertain about their preferences.

Booking Platforms

- When hotel rooms are marketed through a common platform, transaction fees may have an influence on the way hotels compete.
- Fees may affect the inter-temporal allocation of sales, i.e. the ratio of no-money-back to overall bookings.
- Reducing advance purchases can have a *positive* effect on overall surplus as it avoids misallocations.
- Who gains? Consumers? Hotels? Platform?

Objective

- Use Booking.com's transaction data to quantify the effect of competition and fees on the allocation of sales between no-money-back reservations and free cancellations.
- **Practical interest**
 - Platform revenue depends on size of fees directly *and* indirectly through their effect on inter-temporal allocation of sales.
 - Understanding the effect of fees on the prevalence of no-money-back versus free-cancellation reservations is crucial for prediction of platform revenue.
- **Academic interest**
 - Test the theoretical predictions of the advance purchase literature in a new empirical setting.
 - Advance our understanding of two-sided markets in an advance purchase setting.

Theory

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 no-money-back and free-cancellation reservations.
 - ② Hotels choose prices for no-money-back and free-cancellation reservations.
 - ③ Consumers choose between hotels and booking options.

Limitations

Before considering important extensions the model abstracts from

- 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.

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 no-money-back reservations may have a positive effect on platform revenue and hotels' profits.

Empirics

Two Hypotheses

H1: Competition

The more competitive the market is, the more no-money-back reservations are observed relative to free-cancellations.

H2: Transaction fees

Transaction fees influence the allocations of sales across no-money-back and free-cancellation in competitive markets.

The Main Regression

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

Key Variables

- Y : no-money-back reservation dummy
- Comp : competition proxy
- ΔFee : transaction fee difference between no-money-back and free-cancellation rooms

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Control Variables

- On the reservation: check-in dates, days in advance, purpose of the travel, room type, nights, etc.
- On the hotel: stars, chain, location, city, etc.
- Others

The Main Regression

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

Key Assumption: Exogeneity

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

- The marketing strategy of hotel managers influences both ΔFee and Y (uncontrolled confounding variables)
- No perfect measurement of competition (measurement error)
- Estimates are inconsistent

Transaction Fees

Transaction Fees are not exogenous

- Bargaining results
- Hotels can buy higher ranks by paying higher fees

But the original fee that Booking.com made for each hotel is

- the original fee is made based on exogenous characters of hotels
- what are the characteristics? For example, if number of rooms is one key determinants, then it can be used as an IV.

Competition Proxy

Herfindahl-Hirschman Index

- Problem: endogenous
- Why? Price, Inter-temporal Sales and Market Shares

Number of competing hotels

in a well defined geographical area

- Problem: though predetermined, but whether a good proxy for competition?
- For example, many hotels in Amsterdam versus a few hotels in Leiden

Competition Proxy

Other measures of aggregate supply and demand in a given area

- occupancy rate in a given area/hotel price-range

Demand shocks

- Examples: holiday seasons, music festivals, or terrorist attack.
- Such shocks may influence the inter-temporal sales directly.

Supply Shocks

- Booking.com includes some big chain hotels into the system.
- Potential chances for a Difference-In-Difference analysis.

Competition Proxy

Supply Shocks

An Example

- Suppose a big hotel-chain is included in Booking.com in some cities/regions (treatment) but not in other (controls).
- Compare the difference after the shock and difference before the shock between treatment group and control group.

Validity

- customer types and preferences are not changed by such shocks
- only search-friction/competition changes

Help us to find exogenous shocks

The Controls

Controls should not be the mediators of competition or transaction fees.

- Competition influences advance sales through the advance purchase discounts, therefore the discounts should not be controlled.

Relevant controls can be **season/date/hotel/city/customer characteristics**.

Data Requirements

- Transaction Data with price, reservation/hotel related information.
- Companion website posted information on prices, etc.
- Restrict to standard room categories.
- Selected date spans and locations, depending on valid exogenous variations.

Summary

Summary

How does Booking.com's transaction fees influence the inter-temporal allocation of sales in the hotel industry?

- Competition leads to more advance sales.
- Fees influence inter-temporal business stealing.

Based on Transaction Data.

- Require data only on the sellers side of transactions, no need for more sensitive consumer data.

Thank you.

Your insights are much appreciated.