**Homework 2**

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1. Derive two competing platforms’ optimal prices when users are single-homing. Interpret the results.

**Answer:**

Basic assumptions:

There are two horizontally differentiated platform, and , and a Hotelling line with length of . Platform and are located at the two ends. There is a unit mass of buyers and a unit mass of sellers. Each buyer or seller can at most join one platform (both sides are single-homing). And we assume full coverage:

* + let denote the number of buyers joining platform , then
  + let denote the number of sellers joining platform , then
  + both sellers and buyers are uniformly distributed on the Hotelling line.
  + Hotelling transportation cost parameter: for sellers and for buyers.

Platforms compete by designing membership fees , so:

* + buyers’ utility from joining platform (net of transportation cost):
  + sellers’ utility from joining platform (net of transportation cost):

Calculate:

1. Identify the buyer (seller) who is indifferent between joining platform and joining .

For buyers， yields the indifferent buyer’s location

Buyers with prefer platform and buyers with prefer platform .

For sellers, yields the indifferent seller’s location

Sellers with prefer platform and sellers with prefer platform .

1. Now we have the numbers of buyers and sellers joining platform :

and

1. We use and the fact that and , then we obtain:
2. Combining the two equations, we solve
3. The profit of platform i

equals to

We want to maximize for i =1,2. We solve the derivative of them, considering and yields

1. Again, solve the two equations, we got：

□

2. Read the attached article about review website TripAdvisor and address the following questions:

a) Why is there a concern regarding the biased or fake review on TripAdvisor? What are your suggestions to address it (for the platform and for the hotels)?

**Answer:**

Because it was estimated that between 2% and 6% of ratings and reviews posted on websites were either fake or deceptive. There is a review-creating industry and reviewers are offered $1 to $200 per review. Most importantly, customers will be quite easy to identify fake reviews, which will decrease the reliability of the platform. Also, for the hotel, the competitors may write some bad reviews. So, it is a concern.

For the platform, it can develop models to identify genuine customers by record expense calendar, which prohibit ‘professional reviewers’ from writing reviews or make their reviews lower weight coefficients. For the hotel, it can make response to every review to face its shortages and make malicious negative reviews harder to hide.

b) How would you measure the impact of online reviews on reservations? What is the potential problems?

**Answer:**

Find A, B, C,…’s online reservation number, while A has no online review (maybe because it is opened recently), the others have different kinds of online reviews number, rates. All the hotels should are the same kind of hotels (similar location, similar level and same period but different online ratings).

The potential problems include: difficulty in finding similar hotels, hard to attach online reservation numbers and hotels’ other aspects influencing reservation numbers.

c) Will those actions by hotels to encourage guests to write reviews affect the informativeness of the online reviews?

**Answer:**

Yes. The fairness of the platform is based on the absence of external interference and the spontaneous evaluation of consumers. If a hotel encourage guests to write reviews, the review number and review rate will both increase, because most indifferent guests will give a default good review.

d) Comment on Four Seasons Hotels’ and Homewood Suites’ strategies of managing the online reviews.

**Answer:**

Four Seasons Hotels display users’ reviews on TripAdvisor in each Four Seasons property’s Website. This strategy shows guests’ review instead of the hotel’s recommendation, which increases the reliability. However, this strategy have no influence on the rate on TripAdvisor website.

Homewood Suites reply on every review to show they attach importance on customer satisfaction, which will have positive effects on review number and review rate.

3. Prove the following claim: In the standard second-price auction, it is a weakly dominant strategy for bidder i to bid exactly his true value vi (Truth-telling).

**Answer:**

Basic Settings:

N (ex-ante) symmetric players with private information vi.

Action: bi.

Bidder i’s payoff: (vi - pi)if bidder i wins where pi  is the winning price. 0 if bidder i loses.

Prove:

We prove this argument using two steps:

1. **bi = vi weakly dominates bidding any bi < vi.**

Consider player A bids ba = x < vi.

If: **max bi > vi**. Both bids, vi and x, will lose. The payoffs are the same.

If: **x < max bi < vi**. Bidding vi will win while bidding x will lose. Bidding vi yields positive payoff (vi - max bi) while bidding x yields payoff 0.

If: **max bi < x**. Both bids, vi and x, will win. Both payoffs are the same: (vi - max bi).

Then, in all the 3 situations, bidding the truth value is weakly better than bidding **bi < vi.**

1. **bi = vi weakly dominates bidding any bi > vi.**

Consider player A bids ba = x > vi.

If: **max bi > x**. Both bids, vi and x, will lose. The payoffs are the same 0.

If: **vi < max bi < x**. Bidding vi will lose while bidding x will win. Bidding vi yields payoff 0 while bidding x yields a **negative** payoff (vi - max bi).

If: **max bi < vi**. Both bids, vi and x, will win. Both bids yield payoff (vi − max bi).

Then, in all the 3 situations, bidding the truth value is weakly better than bidding **bi > vi.**

According to the two kinds pf stating above, we have that it is a weakly dominant strategy for bidder i to bid exactly his true value vi (Truth-telling).

4. If a platform is using generalized second price auction to sell advertising slots. There are two slots and three advertisers. The first slot receives 200 clicks while the second receives 100. Advertiser 1, 2, and 3 have value per click of $10, 4 and 2, respectively. Could you find an equilibrium and prove it?

**Answer:**

As mentioned in the class, there is an equilibrium that 3 advertisers bid $10, 4 and 2.

**For advertiser 1**, in this situation, he will make profits $1200. If the other 2 do not change, he changes to $a, while a > 4, the profit is also $1200. If he changes to $b, while 4 > b > 2, the profit will be $100\*8=$800. If he changes to $c, while c<2, the profit will be 0. So he has no motivation to change the bid.

**For advertiser 2,** in this situation, he will make profits $200. If the other 2 do not change, he changes to $a, while a > 10, the profit is $-1200. If he changes to $b, while 10 > b > 2, the profit will be also $200. If he changes to $c, while c<2, the profit will be 0. So he has no motivation to change the bid.

**For advertiser 3,** in this situation, he will make profits $0. If the other 2 do not change, however, he has to bid more than $4 to get a slot. But then the price will be $4, which is more than his value. So his better choice is to remain zero profit.