

Assignment 01

Pricing Analytics

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Problem Statement

- There are two pricing & revenue optimization (PRO) consulting groups: Brain and Company (denoted by B) and its competitor Dissenture (denoted by D). Let the customer or client be denoted by C.
- The costs incurred by these companies and the corresponding benefit they serve to a representative consumer is tabulated below.

Company	Cost of offering service (in hundred thousand \$)	Benefit to the customer (in hundred thousand \$)
B	5	20
D	5	15

Table 1. Problem statement: case 1

- Questions:
 - How should B price their service in order to guarantee that they win the business?
 - How would the above pricing decision change if it cost Dissenture only \$4 hundred thousand for offering service?

Assumptions

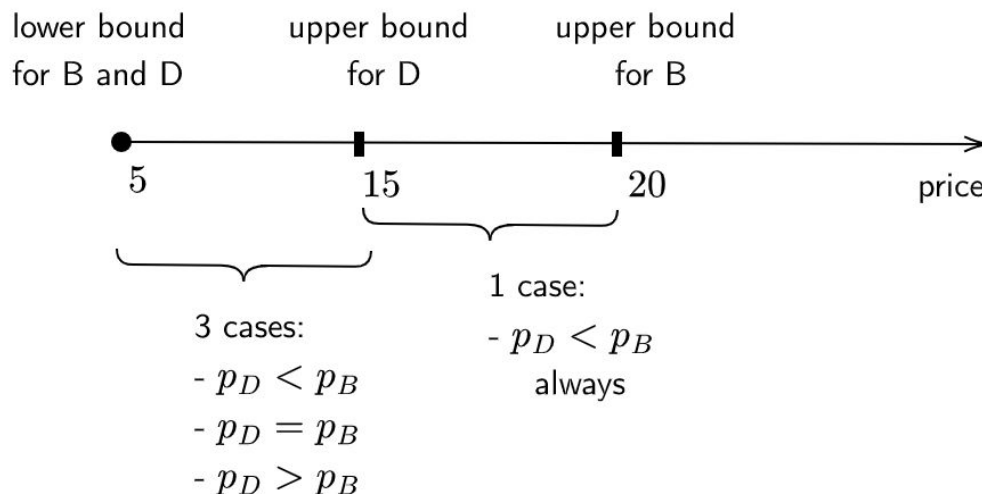
We shall answer the first case pertaining to the parameters in the above table, and then repeat the analysis for the second question with D's cost modified to \$4 hundred thousand. We shall make the following assumptions:

- Both B and D know each other's costs and the customer's benefit. There is *perfect information* here, known with *certainty*.
- The customer is a *rational buyer* who adheres to the 3 assumptions of the rational buyer model:
 - Fixed immutable *reservation price* (RP) for all products sold everywhere,

- Customer derives a *consumer surplus* (CS), defined as the difference between RP and the price paid. Customers do not accept negative CS.
- Rational buyers choose transactions that offer a higher CS, amongst all transactions across various products, sellers and time.

Solution

- From Table 1., we say that the *benefit derived by the consumer C from the service is their RP*.
 - Reasoning: Because the benefit is a clear tangible and fixed cost that the consumer¹ now associates with each service offered.
 - Thus, if p_B is the price² set by Brain and Co, and if p_D is the price set by Dissenture, the consumer surplus is given by $(20 - p_B)$ and $(15 - p_D)$ respectively, for services offered by B and D.
- The prices set by B and D cannot go below the cost of their respective products. Thus we have constraints on prices set: $p_B \geq 5$ and $p_D \geq 5$. Further, since the consumer would not accept a CS of 0, we have $p_B \leq 20$ and $p_D \leq 15$, upper bounds.



- Thus, the various scenarios that could arise in this setting are:
- Consider all the possible scenarios of prices set by B and D.

¹ The terms consumer, customer and client are used interchangeably here.

² All prices and figures are in units of \$ hundred thousand, unless otherwise specified.

Possible prices set by B			Possible prices set by D	
p_B	$CS = 20 - p_B$		p_D	$CS = 15 - p_D$
20	$20 - 20 = 0$		15	$15 - 15 = 0$
19	$20 - 19 = 1$		14	$15 - 14 = 1$
16	$20 - 16 = 4$		10	$15 - 10 = 5$
15	$20 - 15 = 5$		5	$15 - 5 = 10$
10	$20 - 10 = 10$			
9	$20 - 9 = 11$			

Table 2. Possible prices set by B and D

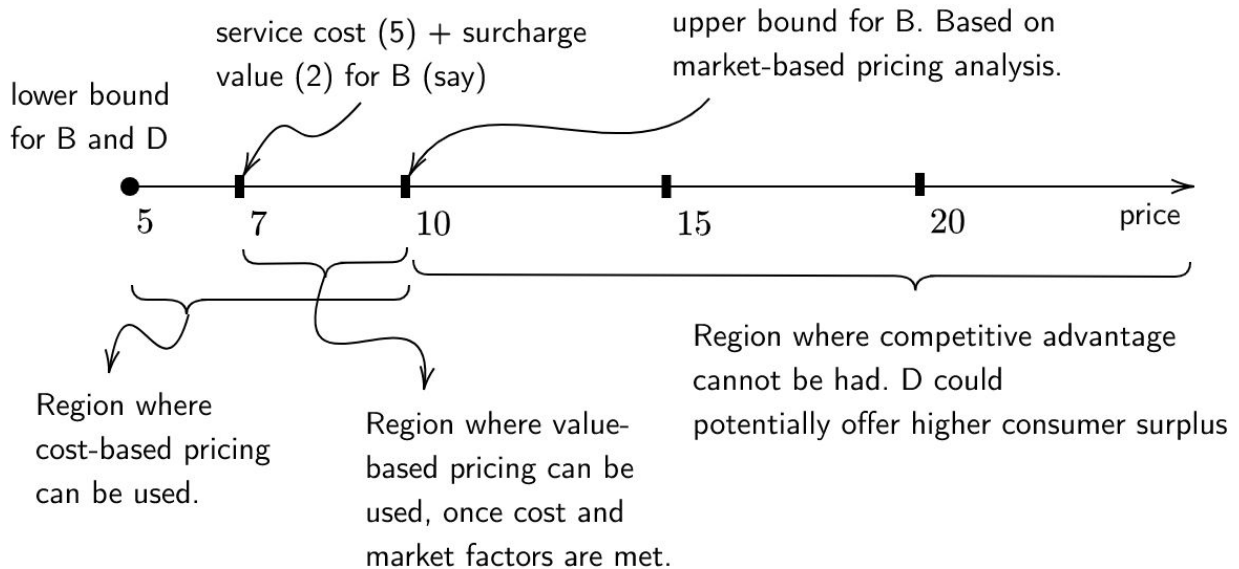
- Thus, the maximum consumer surplus that D can offer is 10, whereas the maximum CS that B can offer is 15, such that their individual constraints are satisfied.
- **Conclusion:** Since the customer chooses the service that gives them the higher surplus, B, in order to win the business must irrespective of the price set by D, must ensure that it always offers the higher consumer surplus. *This can easily be done so long as the price is set at $p_B < 10$.*
- **Thus, as long as Brain and Company sets the price less than \$ 1 million, it would offer a higher CS and would have a competitive advantage over Dissenture.**

Caveats and extensions

The above method can be thought of as a combination of cost-based and market-based pricing. This is done in two steps:

- Market-based pricing: Determine what price set would offer a competitive edge for the company. This results in a range of prices between the fixed costs + production cost (service in our case) and the upper bound of the max CS price (based on competition). In this example the range is \$ 5 hundred thousand to \$ 1 million.
- Cost-based pricing: Now set up the surcharge within the above range such that the fixed + production (service) costs are met.

- Within this range price in (fixed+service+surcharge, upper-bound-for-competitive -advantage), one could also adopt a value-based pricing, where the price can potentially be set higher for a customer who values the service higher.



Customer also has perfect information (fair price argument)

Now, let us consider the scenario that the customer also has perfect information and is aware of the costs associated with the service provided by both B and D. In such a situation, signalling too plays an important role in the customer's buying decision.

The customer would prefer choosing the company B so long as it feels that the price set by B is fair. If they know that the value that company B associates with the service is its own cost which is 5 and the customer's value is X , then they would perceive the price of $p = (X + 5)/2$ to be fair and might be willing to procure service at any value less than p .

If $p = (X + 5)/2$ turns out to be greater than 10, the upper bound for competitive advantage, then B should still set the price $p_B < 10$. On the contrary if $p = (X + 5)/2$ is less than 10, then in order to signal fair pricing B would have to set the price at a value equal to or less than this number. The lack thereof, may not necessarily lead to the customer preferring D, rather could lead to the customer not procuring the service at all and customers might think or other parties or measures.

Change in Dissenture's service cost

If the cost of service for D changes to \$4 hundred thousand, then

Company	Cost of offering service (in hundred thousand \$)	Benefit to the customer (in hundred thousand \$)
B	5	20
D	4	15

Table 3. Problem statement: case 2

In this case, we can repeat the above analysis. The consumer surplus given by $(20 - p_B)$ and $(15 - p_D)$ respectively, for services offered by B and D remains the same. However, the constraints are now given by $p_B \geq 5$ and $p_D \geq 4$. Further, since the consumer would not accept a CS of 0, we have $p_B \leq 20$ and $p_D \leq 15$. The CS for this case is tabulated below.

Possible prices set by B		Possible prices set by D	
p_B	$CS = 20 - p_B$	p_D	$CS = 15 - p_D$
20	$20 - 20 = 0$	15	$15 - 15 = 0$
19	$20 - 19 = 1$	14	$15 - 14 = 1$
16	$20 - 16 = 4$	10	$15 - 10 = 5$
15	$20 - 15 = 5$	5	$15 - 5 = 10$
10	$20 - 10 = 10$	4	$15 - 4 = 11$
9	$20 - 9 = 11$		
5	$20 - 5 = 15$		

Table 4. Possible prices set by B and D

- The maximum consumer surplus that D can offer is now increased to 11, whereas the maximum CS that B can offer still remains at 15.
- **Conclusion:** In order to win the business must irrespective of the price set by D, B must ensure that it always offers the higher consumer surplus. *This is done so long as the price is set at $p_B < 9$. Thus, as long as Brain and Company sets the price less than \$ 900,000 it would offer a higher CS and would have a competitive advantage over Dissenture.*

Pricing Strategies

Cost-based pricing

- Price = fixed cost + production cost + surcharge;
- Surcharge determined by factoring fixed cost allocation and required return on capital. Or by an arbitrary rule-of-thumb.
- Example 1: Pricing of *construction equipment* such as flooring tiles or roofing sheets are done in this manner. It appears to be objective and allows financial prudence on the part of the manufacturer.
- Example 2: Pricing of *food items in a restaurant* are set on a cost plus basis. The cost of ingredients and service, over which a markup is added and the price is set.

Market-based pricing

- Prices determined solely by competition. Differs with respect to context.
- Used by small players to capture a segment of the market from the leaders.
- Example 1. *Jio in its initial stages priced mobile data* and call packages at a price significantly lower than market to capture segments from competitors such as Airtel or Vodafone. In a highly aggressive venture, it offered free mobile data for over a year to anyone who procured their connection.
- Example 2. Likewise, in the *mid-price segment of the Android smartphone* market, several firms set prices for nearly identical phones, simply to one-up the competitors.

Value-based pricing

- Price relates to the value associated by the customer. Again, contextual here.
- With differing product value between the customer & the firm, one can think of a fair value of a product and the setting of price in this context.
- Example 1: *Collectible items such as artefacts or paintings* at an auction often go for a huge margin from its original value based on that associated by buyers.
- Example 2: Often *property such as houses bought from realtors* are valued differently based on the value it brings to a potential house-buyer.

References

Phillips, Robert Lewis. Pricing and revenue optimization. Stanford University Press, 2005.
Dr. Vijaya Chebolu-Subramanian, Course Lecture Slides for Pricing Analytics. 2020.