LECTURE 4.6

DYNAMIC PRICING:

YIELD MANAGEMENT

DYNAMIC PRICING: YIELD MANAGEMENT

Discussion to this point has largely been static, but we don't live in a static world.

Airlines are the masters of changing prices over time. This also works for services such as hotel rooms

Think about dynamic price discrimination, revenue management or yield management

Why dynamic? Because booking a ticket now precludes the option of booking it later at a higher price. The flexibility or option value is lost when a ticket is booked.

DYNAMIC PRICING: YIELD MANAGEMENT

Consider the problem of selling Q tickets for a flight at date T. The opportunity cost of selling a ticket to a customer today is the foregone sales to another customer later.

Suppose there are two types of customer

- First-class: willing to pay up to p_f
- Discount: willing to pay up to p_d

Customer arrival is uncertain

- let n be the probability the next customer is a discount traveller
- let s be the probability the flight will sell out at a price p_f before travel i.e. a seat sold today will displace a first-class passenger

Suppose q out of Q seats have been sold. Should the airline sell only premium fares (p_f) from now on?

DYNAMIC PRICING: YIELD MANAGEMENT

If a discount traveller arrives, it is better to sell a discounted fare if:

$$p_d > p_f(1 - n + ns) = p_f\big(1 - n(1 - s)\big)$$

The term in the first brackets is the sum of two probabilities that selling the seat at a discount today will displace a full fare passenger

- with probability 1 − *n*, the next traveller is first-class
- with probability *ns*, the next will not pay the first-class fare, but the flight will sell out.

Rearranging, we obtain:

$$n(1 - s) > \frac{p_f - p_d}{p_f}$$

[Note: this comes from McAfee – there is an error in McAfee leading to a slightly different equation.]

DYNAMIC PRICING: YIELD MANAGEMENT

Sell a discounted fare if:

$$n(1-s) > \frac{p_f - p_d}{p_f}$$

What happens over time?

- *s* decreases as time passes without sales → better to sell a discount fare now
- *s* increases every time a seat is sold → remaining seats become more valuable

As we approach the travel date, what happens to *n*?

If *n* gets smaller as time to flight departure approaches, then it makes it less likely that the expression above holds in which case the airline is better off NOT selling another discount fare. That is, they offer only full fares as the departure date fo the flight approaches.

What does this imply about the profitability of selling discount tickets?