Pricing Strategies and Discrimination

Economics of Public Utility Regulation

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MarkUp Pricing

- Percentage of cost (usually experience based) is added to cost (e.g. $50) to obtain the selling price (e.g. $80):
  - *Markup* is (80-50) / 50 = 60%
- Firm with many products to sell may need a simple pricing strategy.
- Way of dealing with uncertain demand.

A Simple MarkUp Rule

- If the firm's elasticity of demand is E_F, then:

$$MR=P[1+E_F]/E_F$$

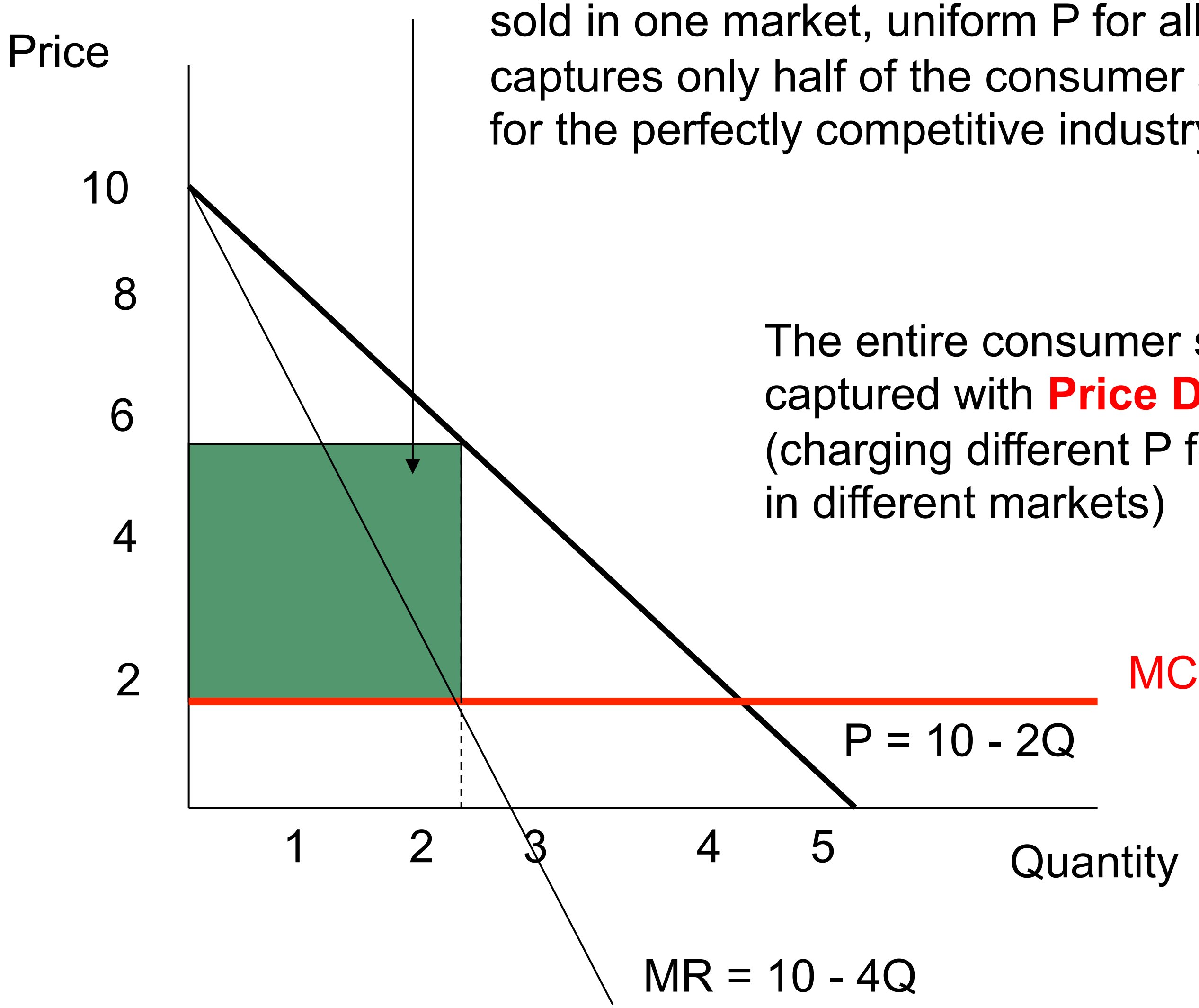
- Set $MR = MC$ and simplify:

$$P=[E_F/(1+E_F)]\times MC=m\times MC$$

- This relationship holds only for elastic demand $|E_F|>1$.
- The optimal (π maximizing) P is a m over the relevant costs!
- More elastic the demand, lower the m.
- The higher the relevant cost the higher the P.

Pricing and Profits

$8 = **Standard Pricing Profit** (homogeneous product, sold in one market, uniform P for all units) captures only half of the consumer surplus for the perfectly competitive industry



The entire consumer surplus could be captured with **Price Discrimination** (charging different P for different quantities or in different markets)

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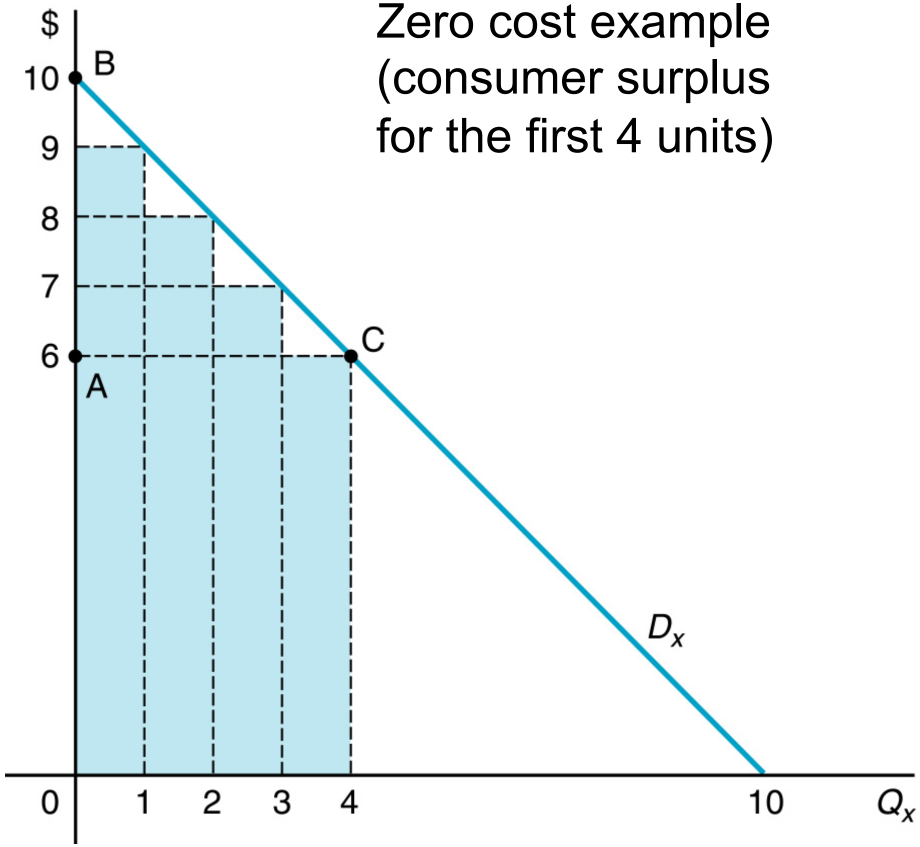
First Degree or Perfect Price Discrimination

To extract all surplus from consumers charge each consumer the maximum amount he or she will pay for each incremental unit

In practice, transactions costs and information constraints make it difficult to implement perfectly (car dealers and some professionals come close).

Price discrimination won't work if consumers can resell the good.



Zero cost example (consumer surplus for the first 4 units)

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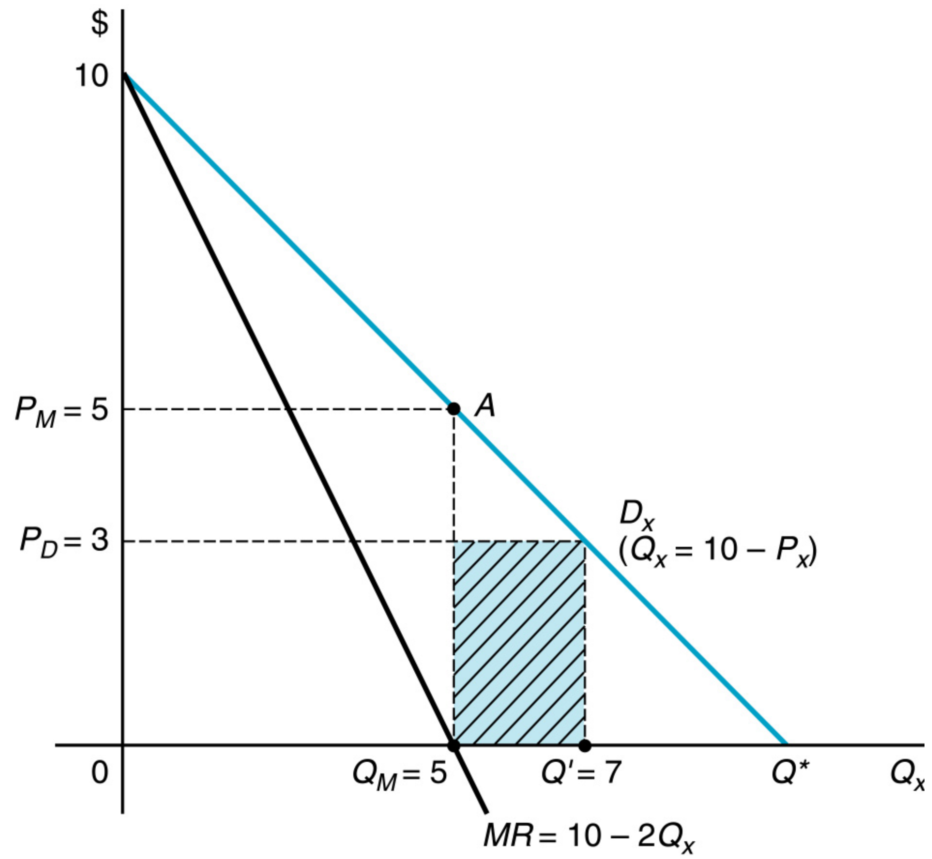
Second Degree Price Discrimination

Use a discrete schedule of declining prices for additional blocks of quantities (e.g. Electric utilities: lower P for additional units).

For no cost case with single price set at $5 consumer purchase 5 units for max profit of $25.

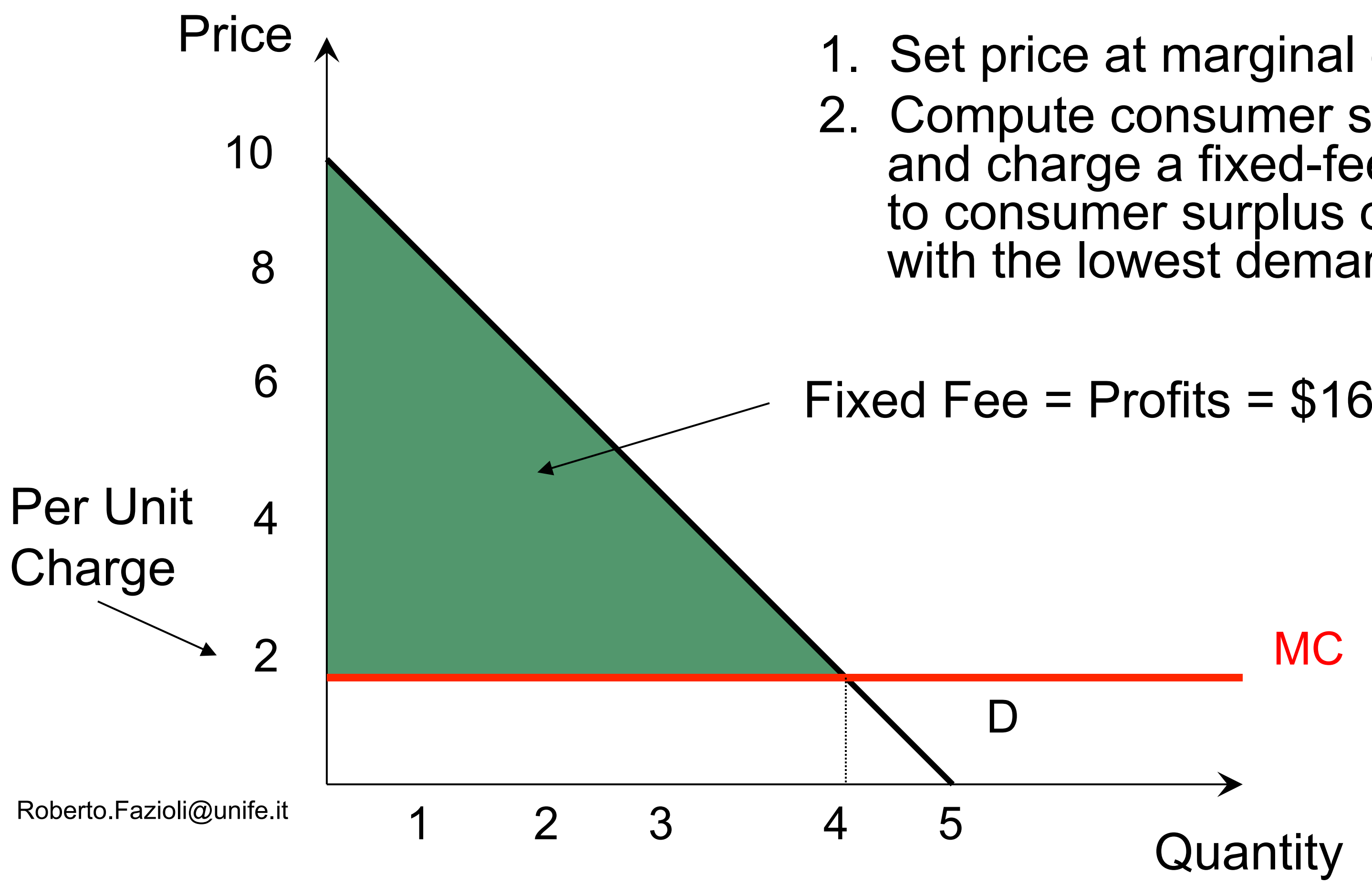
With a discount of $2 for additional purchases of up to 2 units, consumer purchases 7 units, increasing profit by $6.

Zero cost example



Two-Part Pricing

When it isn't feasible to charge different prices for different units sold, but demand information is known, two-part pricing may permit you to extract all surplus from consumers (sports clubs, utilities, etc.).



1. Set price at marginal cost.
2. Compute consumer surplus and charge a fixed-fee equal to consumer surplus of buyer with the lowest demand.

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Price discrimination

The practice of charging different consumers different prices for the same good

Two major flavors:

- Direct price discrimination: based on observable characteristics of customers
- Indirect price discrimination: making offers available to all consumers and letting them choose the offer that is best for them

Price discrimination is also known as value based pricing

Examples

- American Airlines' yield management system
- Senior-citizen discount at a movie
- Discounts to airline frequent flyers
- Quantity discounts such as 'buy one and get the second at half price'
- Newspaper coupons and inserts

Direct price discrimination

- Conceptually, the simplest pricing tool
- Charge customers more or less, depending on their identity or type
- Some means of identifying customers:
  - -location
  - -other possessions or purchases
  - -status
  - -age
  - -employment
  - -gender
- The goal is to identify customers characteristics with value that customers place on the firm's products

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Conceptualizing price discrimination

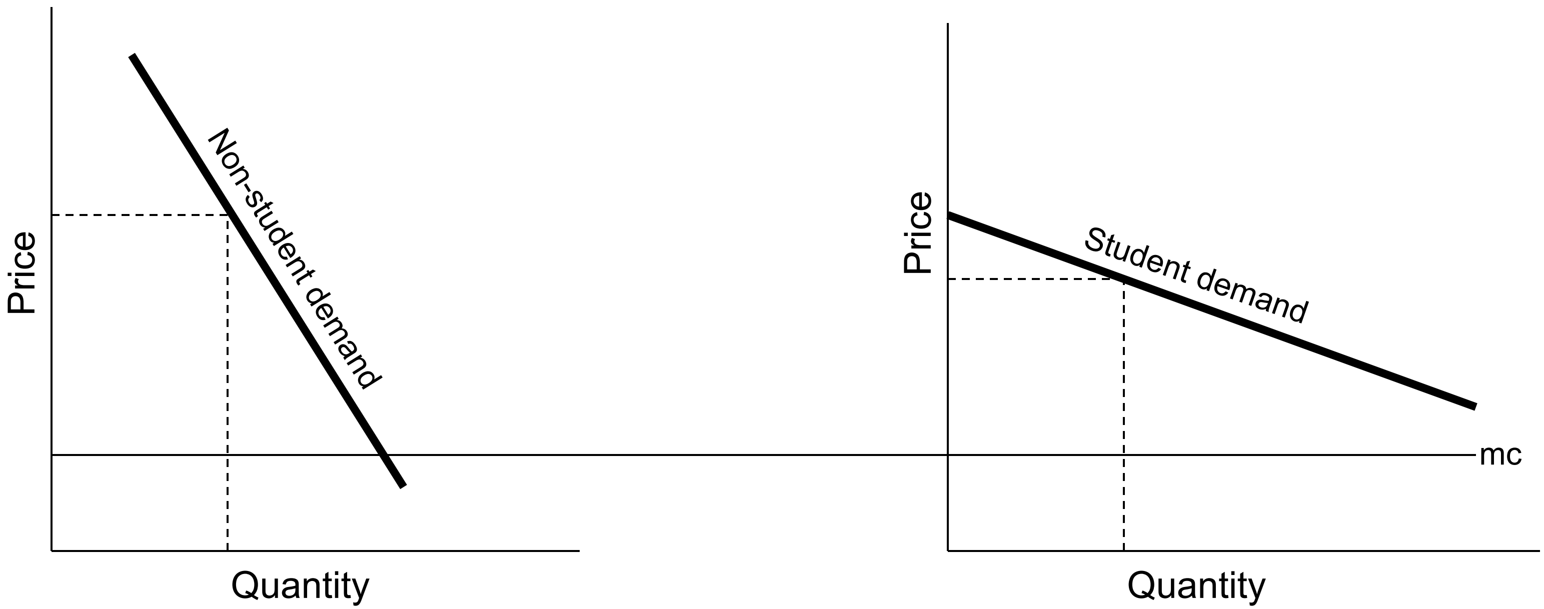
- The building block is the concept of *price elasticity*
- The 'monopoly pricing rule' states that the profit-maximizing price-cost margin is

$$(p-mc)/p=1/\epsilon,$$

where ϵ=elasticity of demand; p=price; mc=marginal cost

- Clearly, the profit maximizing price is higher when demand is less elastic
- A firm would like to set as price for *each* customer so that the monopoly pricing rule would hold for that customer's demand

Example: Student vs non-student prices



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Price elasticity and competitive advantage

	Cost advantage (low C vs competition)	**Benefit advantage (high B vs competition)**
High price elasticity of demand	•Modest *price cuts* gain lots of market share •*Share strategy*: Underprice competitors to gain share	•Modest *price hikes* lose lots of market share •*Share strategy*: Maintain price parity with competitors (let benefit advantage drive share)
Low price elasticity of demand	•Big *price cuts* gain little market share •*Margin strategy*: Maintain price parity with competitors (let lower cost drive higher margin)	•Big *price hikes* lose little market share •*Margin strategy*: Charge price premium relative to competitors.

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Impediments to direct price discrimination

1. Informational: it is not easy to observe customer's willingness to pay
2. Customers with inelastic demand have an incentive to conceal his fact
3. Different prices to different people create opportunities for arbitrage

Factors preventing arbitrage

- Transportation costs
- Legal impediments to resale
- Personalized products or services
- Thin markets and matching products
- Informational problems

Indirect price discrimination

Major advantages

-not necessary to observe consumer characteristics

-arbitrage is prevented by the design of the pricing scheme

Coupons

Common method of indirect price discrimination

Work as a price discrimination tool because they are costly to use

Based on the idea that people who are more price sensitive also have a low value of time

Quantity discounts

These include 'buy-one-get-one free' offers, frequent-buyer programs etc

Few quantity discounts are based on costs

Linear or 'two-part pricing' schemes are sufficient for most indirect price discrimination schemes: - a fixed charge and a marginal "per unit" charge

Risk as price discrimination

A product may be sold for \$10 or for \$11 with a 1% chance of winning \$90

If state lottery payouts are 50% (\$1 returning 50c), then 1% chance of winning \$90 would be worth \$1.80

Thus the bundle represents a discount of 80c to those who like gambling

Applications to internet auctions

Product bundling

- Combining two (or more) products into one
- E.g. computers are often bundled with a monitor and/or printer
- There is no price discrimination in Pure Bundling
- Mixed Bundling is a very effective form of price discrimination
- Surprisingly, like co-promotions this can be done with unrelated products also

Peak-load pricing

- During peak capacity utilization, selling additional units reflects cost of adding capacity
- At off-peak times, incremental costs are low since no capacity needs to be added
- *Peak-load pricing is about allocating the costs of capacity to the relevant demand*
- This is important for airlines, hotels and electricity. Peak electricity costs can easily be five times the off-peak costs
- Using average cost as indicator of incremental cost is ill-advised:
- Average cost will be much higher than incremental costs at off-peak times and vice versa at peak times
- Thus average cost pricing (average cost plus markup) may result in losses at peak periods and inability to recover cost of capacity

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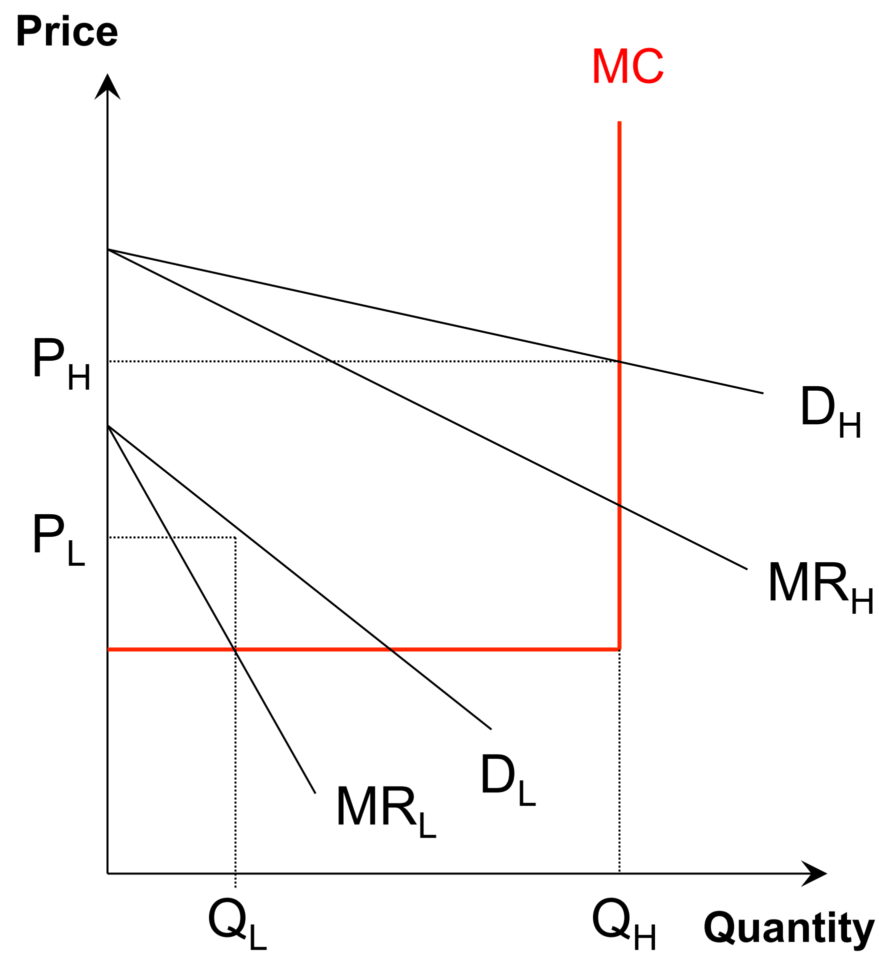
Peak-Load Pricing

- A firm with high TFC relative to TVC produces a service that cannot be stored: phone services, hotels, theaters, airlines etc.
- Suppose demand shifts over the day or week or year

- When demand during peak times is higher than the capacity of the firm, the firm engages in *peak-load pricing.*
- Charge a higher price (P_H) during peak times (D_H)
- Charge a lower price (P_L) during off-peak times (D_L)



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Yield management in airlines

- Main features:
  - seats reserved for full-fare passengers
  - discount seats are full of restrictions
  - there is dynamic price discrimination
- Dynamic element is due to full-fare consumers appearing late in the process
- Important to price the *option value* of the flexibility that is lost when a ticket is booked

Yield management in airlines

- Let there be full fare seats and discount seats with prices p_F and p_D. $p_F > p_D$
- When to stop selling discount seats?
- Suppose *q* seats have been sold and *Q-q* remain out of a total *Q*
- Let *n* be probability that next request comes from a passenger who will not pay full fare
- Let *s* be probability that the plane sells out
- Thus seat sold at a discount today will displace a full fare passenger

Yield management in airlines

- Refusing to sell another discount seat produces revenue p_F if:

  -next person to call will pay full fare (w.p. 1-*n*)

  -next person will not pay full fare and the plane sells out at full fare (w.p. *n*(1-*s*))

- It is better to sell an additional discount seat if

  $p_D > p_F(1-n+n(1-s))$

- Thus it is profitable to sell the discounted ticket if

  $$ns > \frac{p_F - p_D}{p_F}$$

- *Most important fact is probability that plane is full !*

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Yield management in airlines

- Implementation of this formula is a statistical problem of estimating *n* and *s*
- This can be done through historical data or by managerial learning and judgment
- From a pricing perspective the correct measure of capacity utilization is the proportion of full flights, rather then the proportion of occupied seats