MANAGERIAL ECONOMICS CHAPTER 12

Price and Output Determination:
Monopoly and Dominant Firms

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# Price and Output Determination: Monopoly and Dominant Firms
Chapter 12

- "*Monopoly*" conjures images of huge profits, great wealth, and indiscriminate power, labeled as *robber barons*.

- There are also exist monopolies that are not very profitable, and those regulated by State Public Service or Utility Commissions. Some have had very low rates of return on invested capital.

- We look at unregulated monopolies and regulated monopolies (known as *utilities*).

Sources of Power for a Monopolist

- **Legal restrictions** -- copyrights & patents.

- **Control of critical resources** creates market power.

- **Government-authorized franchises**, such as provided to cable TV companies.

- **Economies of size** allow larger firms to produce at lower cost than smaller firms.

- **Brand loyalty and extensive advertising** makes entry highly expensive.

- **Increasing returns in network-based businesses** - compatibilities increase market penetration.

What Went Wrong With Apple?
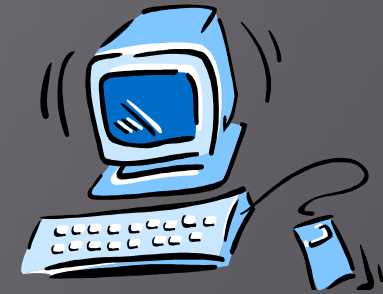
- Apple tried to pursue increasing returns by trying to be the industry standard
- Tried to protect is graphical interface code (GIC) from infringement
- Lead to Apple being less compatible with software being developed
- Microsoft recognized and became the industry standard

An Unregulated Monopoly

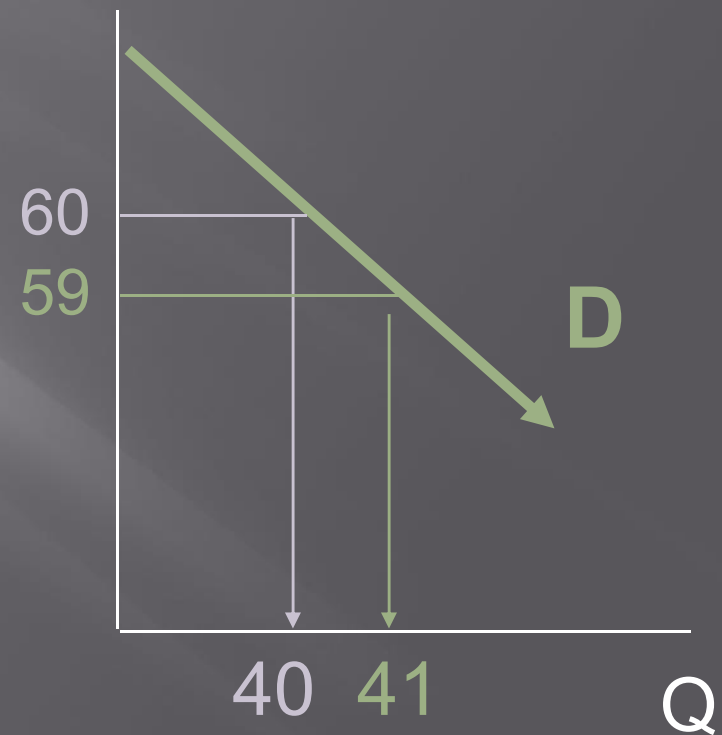**Monopoly**: Single Seller; Entry is Prohibited; No Close Substitutes

1. FIRM = INDUSTRY
2. MR < P

$P = 100 - Q$

$TR_1 = 60 \cdot 40 = 2400$
$TR_2 = 59 \cdot 41 = 2419$

$\underline{}$

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So. MR = 19 where MR < P

3. At output where MR = MC, profit is maximized

Proof: *Max* Π = TR - TC

Set $d\Pi/dQ = 0$

$d\Pi/dQ = dTR/dQ - dTC/dQ$

equal to zero

0 = MR - MC

MR = MC

MC

P_M

D

Q_M

MR
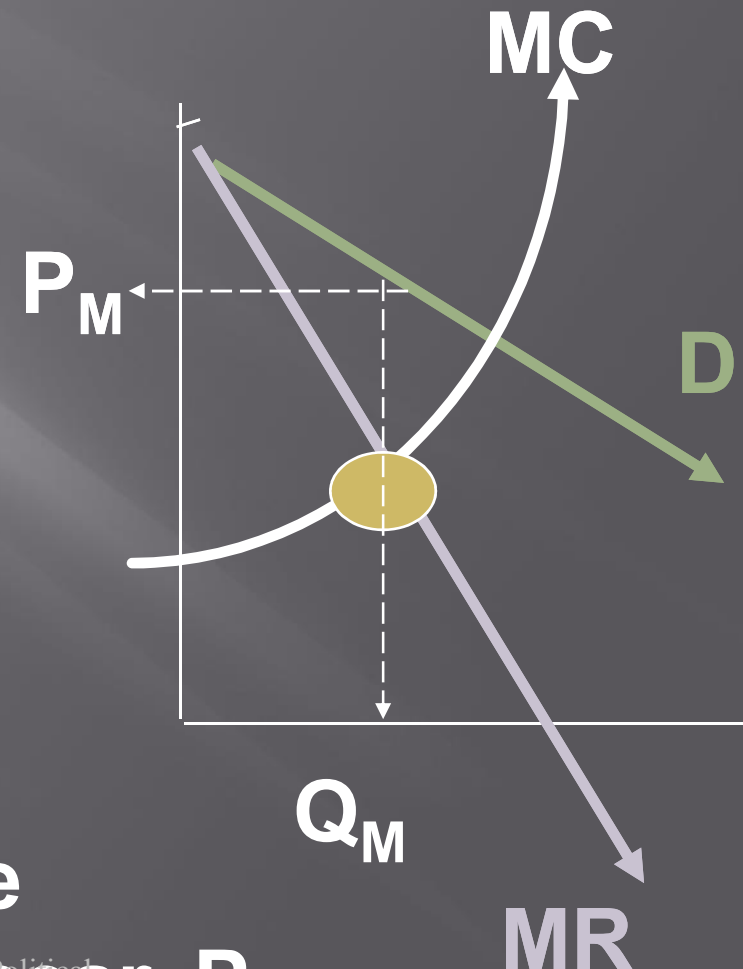
4. Charge highest price that the market will bear, P_M

If we use a linear demand curve:

MARGINAL REVENUE is twice as steep as a linear demand curve

If $P = a - b \cdot Q$, then

$$TR = aQ - bQ^2$$

so

$$MR = a - 2b \cdot Q$$

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MONOPOLY PROBLEM

- Find the monopoly quantity if: **P = 100 - Q**, and where MC = 20.
- Start where **MR = MC**
  - TR = P•Q = $100 \cdot Q - Q^2$
  - MR = 100 - 2•Q = 20
  - 80 = 2•Q
  - Q_M = <u>40</u>
- Find Monopoly Price:
- P_M = 100 - **40** = <u>**60**</u>

> **The highest price that the market will bear.**

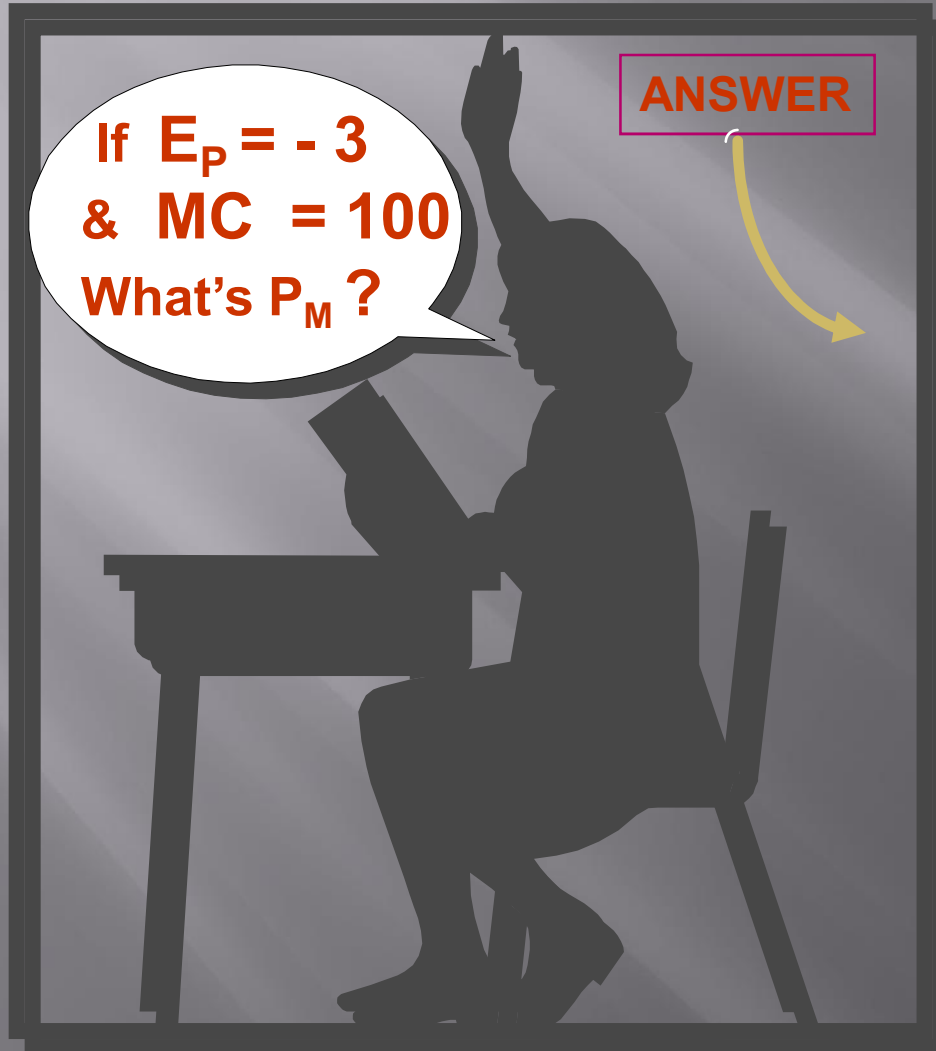# The Importance of Price Elasticity for a Monopoly

MONOPOLY has MR = MC

$TR = Q \cdot P(Q)$

$MR = P + (dP/dQ)Q = P [1 + (dP/dQ)(Q/P)] =$

$P[1 + 1/ E_P]$

As E_P goes to negative infinity, MR approaches P

$$P [1 + 1/ E_P] = MC$$

Marginal Revenue

Example: If E_P is infinite, then $MR = P = MC$

If $E_P = -3$ & $MC = 100$ What's P_M ?

ANSWER

- $MR = MC$ implies
- $P[1 + 1/(- 3)] = 100$
- $P[2/3] = 100$
  So, $P = \$150.$
- If $E_P = -5$, then optimal monopoly price falls to $125.
- The **more elastic** is the demand, the **closer is price to MC.**

EVALUATION OF MONOPOLY

- **Wealth transfers** from CONSUMERS to PRODUCERS: CS falls & PS rises in monopoly

- Economic **Profits** are **positive** even in the **Long Run**

- **P > MC**, price doesn't signal cost

- Output is RESTRICTED
  - Monopolists MUST restrict quantity
  - Licenses restrict entry into occupations

- Dead Weight Social Loss (DWSL)

MC

P_M

C

S

PS

D

DWSL

Q_M
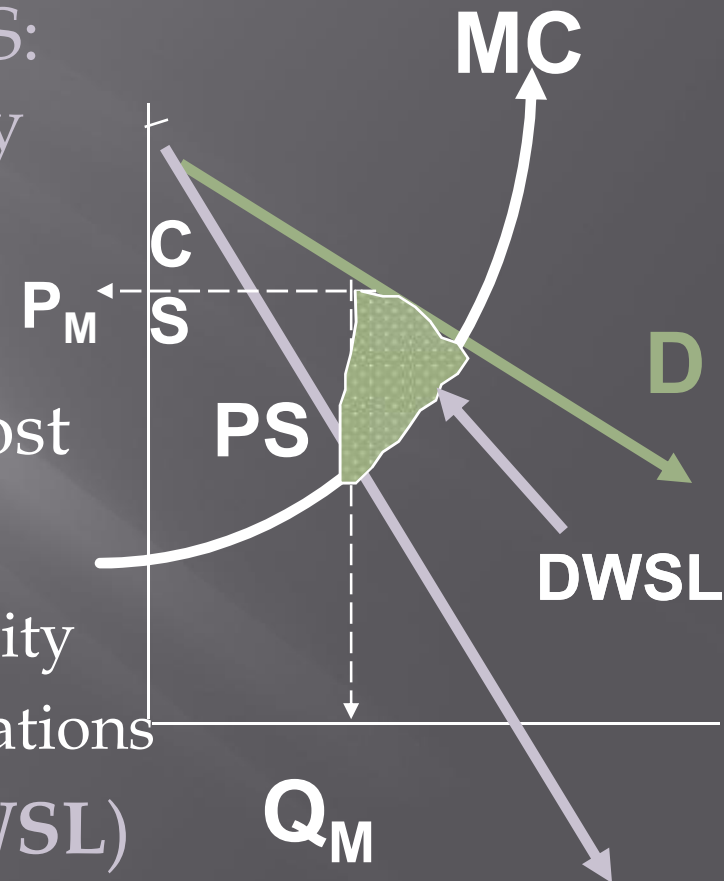
Additional Problems with Monopoly

- ☐ **Technical Inefficiency**
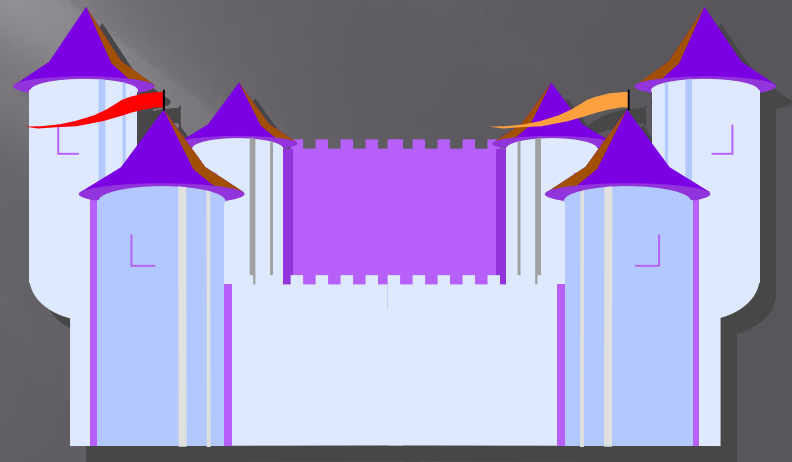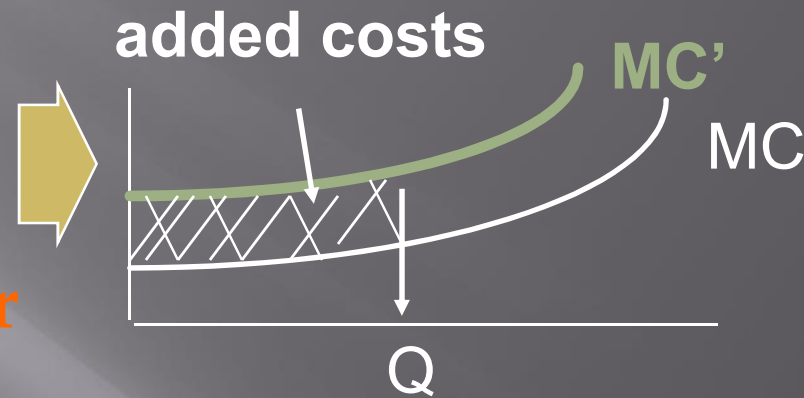 - ▪ monopolists may be lax on costs
- ☐ **Rent-seeking Behavior**
  - ▪ firms may spend great sums to preserve monopoly power.
- ☐ Higher Incidence of **Discrimination**
  - ▪ textiles & agriculture *vs* plumbing & electrical work
- ☐ Less **Technologically**

added costs

MC'

MC

Q

monopolists as less than modern or efficient

Monopoly Pricing

- Regression results for *Land's End* Sportswear:

- **Log Q = - .4 -1.7 Log P + 1.2 Log Y**

  (3 . 2)   (4. 5)

- Let MC of imported sports jacket be $19.50, **find** the **Monopoly Price** for a *Land's End* jacket.

- **ANSWER**: P(1 + 1/E) = MC
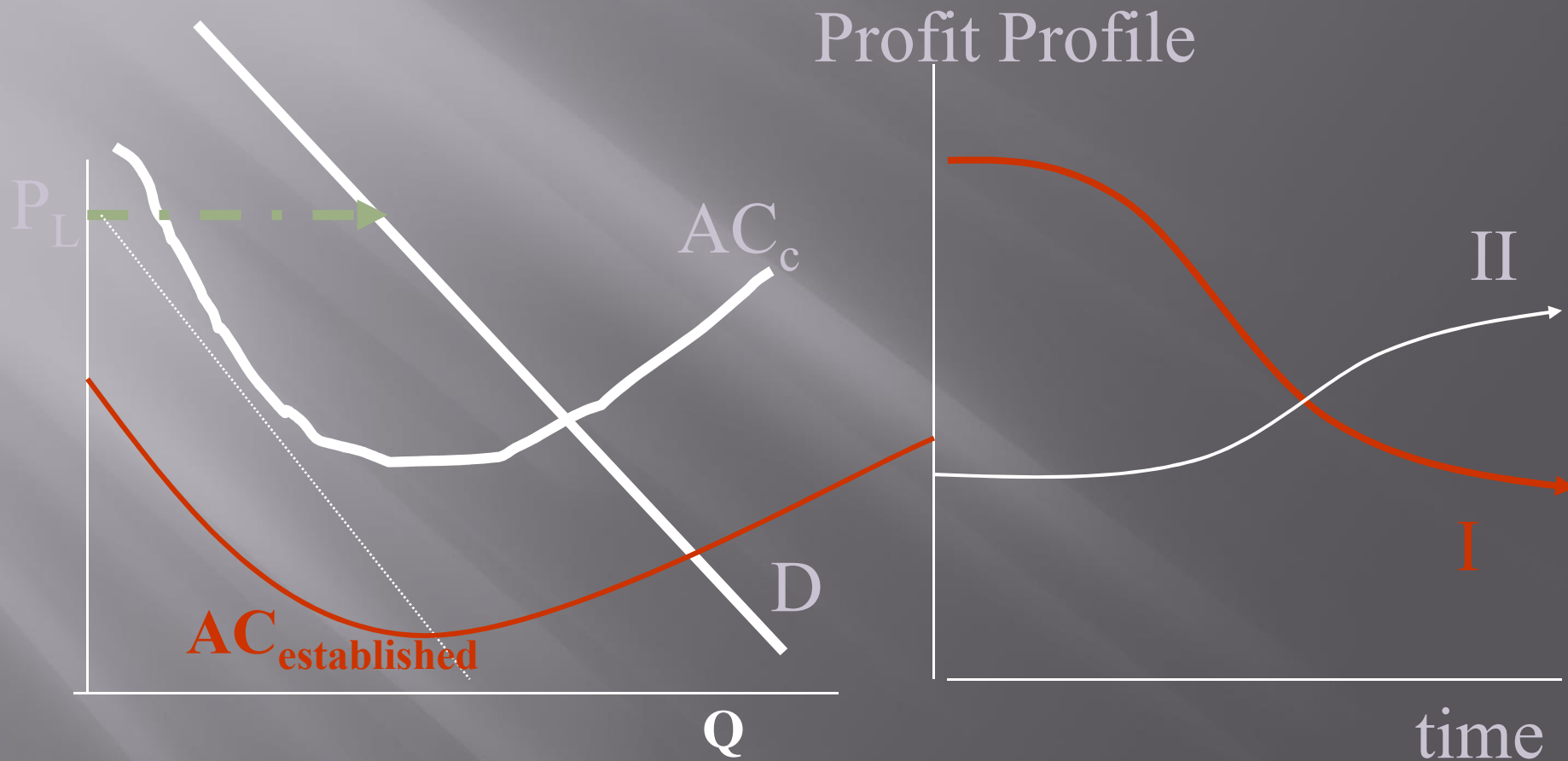
  - P (1 + 1/(-1.7)) = 19.50

  - **P = $47.36**

Limit Pricing

- An established firm considers the possibility of new entrants with distaste.

- Suppose a new entrant would have a   U-shaped average cost curves.

- Suppose also that the established firm has created some brand loyalty, such that entrants must under-price them to take away their customers.

AC

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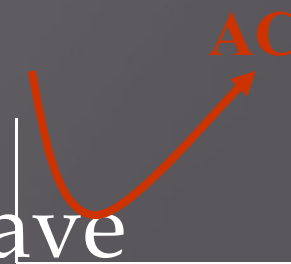
The competitor entrant has no demand at limit price P_L.

Profit Profile

P_L

AC_c

$AC_{established}$

D

Q

II

I

time

Which profit profile (I or II) represents monopoly pricing?
Would a stockholder prefer profile I or II?

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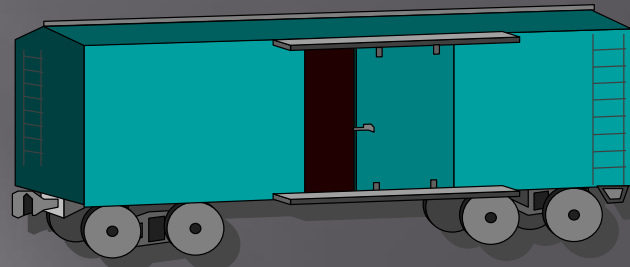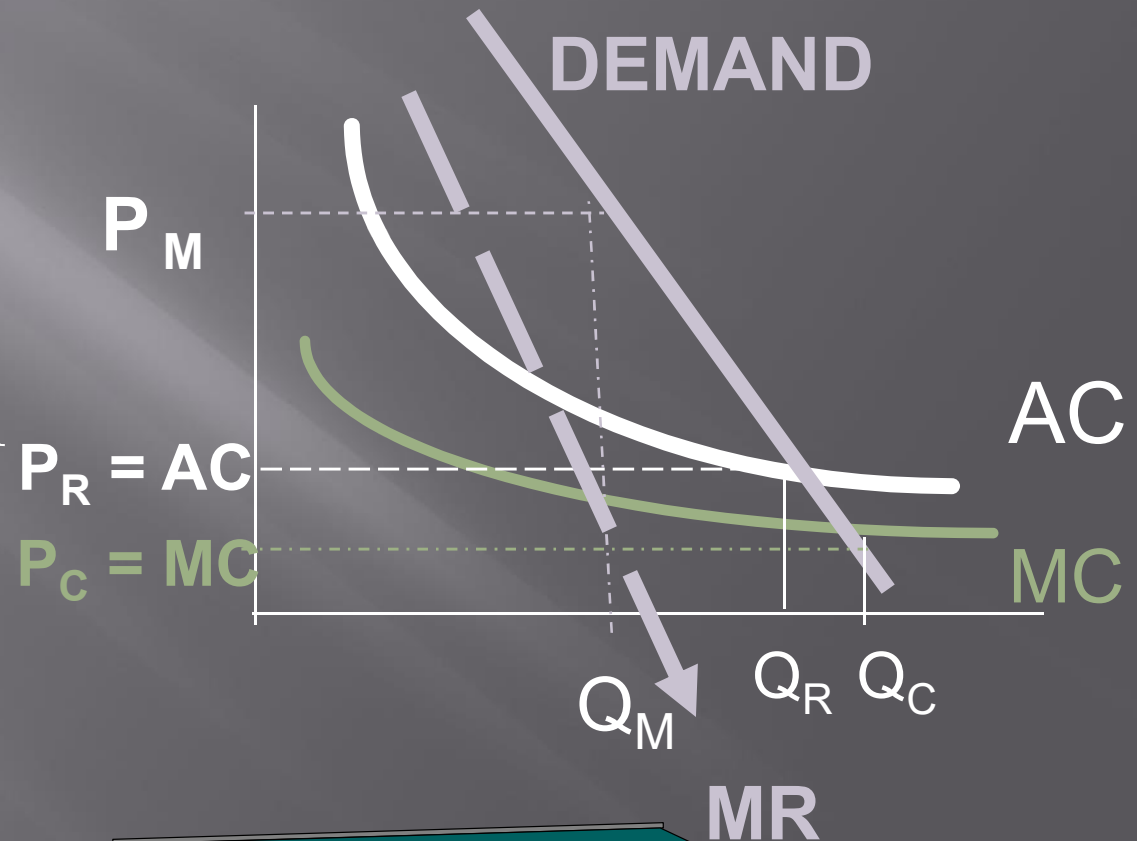
NATURAL MONOPOLY

- ▫ **Declining Cost Industries**
  - ■ economies in distribution
  - ■ economies of scale
- ▫ Without Regulation they face **Cyclical Competition**
  - ■ railroad history
  - ■ frequent bankruptcies

DEMAND

P_M

$P_R = AC$

$P_C = MC$

AC

MC

Q_M Q_R Q_C

MR

Solutions to the Problem of Natural Monopolies

- **PREVENT ENTRY**, set **P = MC** and **subsidize**.
  - subsidies require some form of taxation, which will tend to distort work effort.
  - subsidies to AMTRAK
- **NATIONALIZE**, prevent entry, set price typically low
  - governments find changing price a highly political event
  - once popular solution in Europe

- **REGULATE**, prevent entry, & set **P = AC**
  - common in US for local telephone, electricity, water
- **FRANCHISE** through a bidding war, likely   P = AC
  - Cable T.V.
  - concessions at various stadiums

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The Regulatory Process

- Each state has Public Utility Commissions or Public Service Commissions who determine entry into the industry, jurisdictional disputes, and set a fair rate of return on the rate base.

- If a company wants higher rates, it petitions the Commission for a specific amount of money. A quasi-judicial "rate case" hearing occurs before an administrative law judge. Evidence from the firm, the staff, and others determines if rate relief is justified or not.

- The revenue (R) must cover all operating costs (C) plus a permissible rate of return (k) on the rate base (V-D), where D is the accumulated depreciation and V is the value of the firm's assets.

$$R = C + (V - D) \cdot k$$

- The price for each class of customer, residential, commercial, or industrial, must cover the costs.

- Utilities are permitted to price discriminate across classes of customers.

Price Discrimination

- <u>Price Discrimination</u> -- Goods which are **NOT** priced in proportion to their marginal cost, even though technically similar

- A variety of price discriminating techniques appear in Chapter 16 on Pricing Techniques.
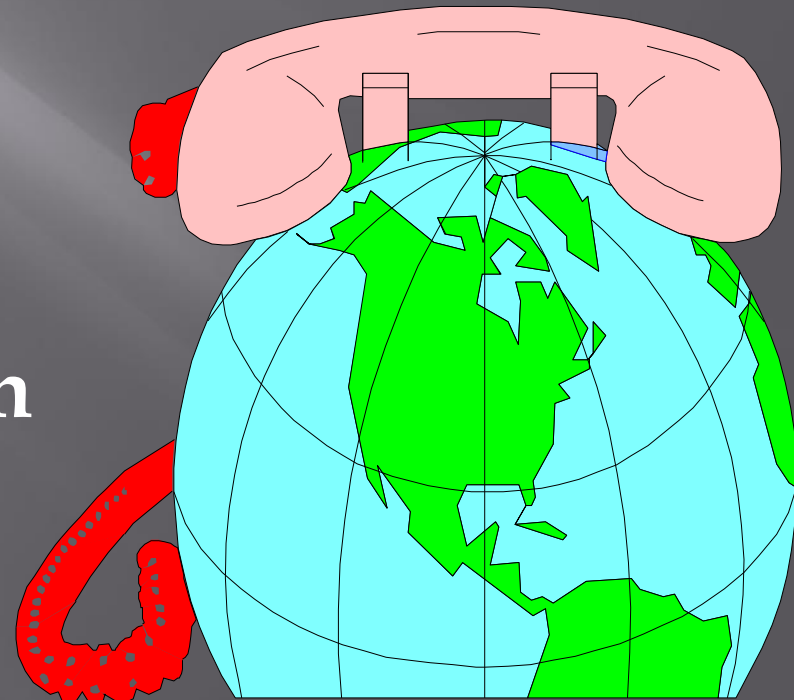
Block Pricing

- **Price declines as the quantity purchased increases**

- *Examples:*
  - Electrical rates (at one time)
  - TJ Maxx, with the second pair of slacks at half price
  - telephone charges
  - foreign film festivals
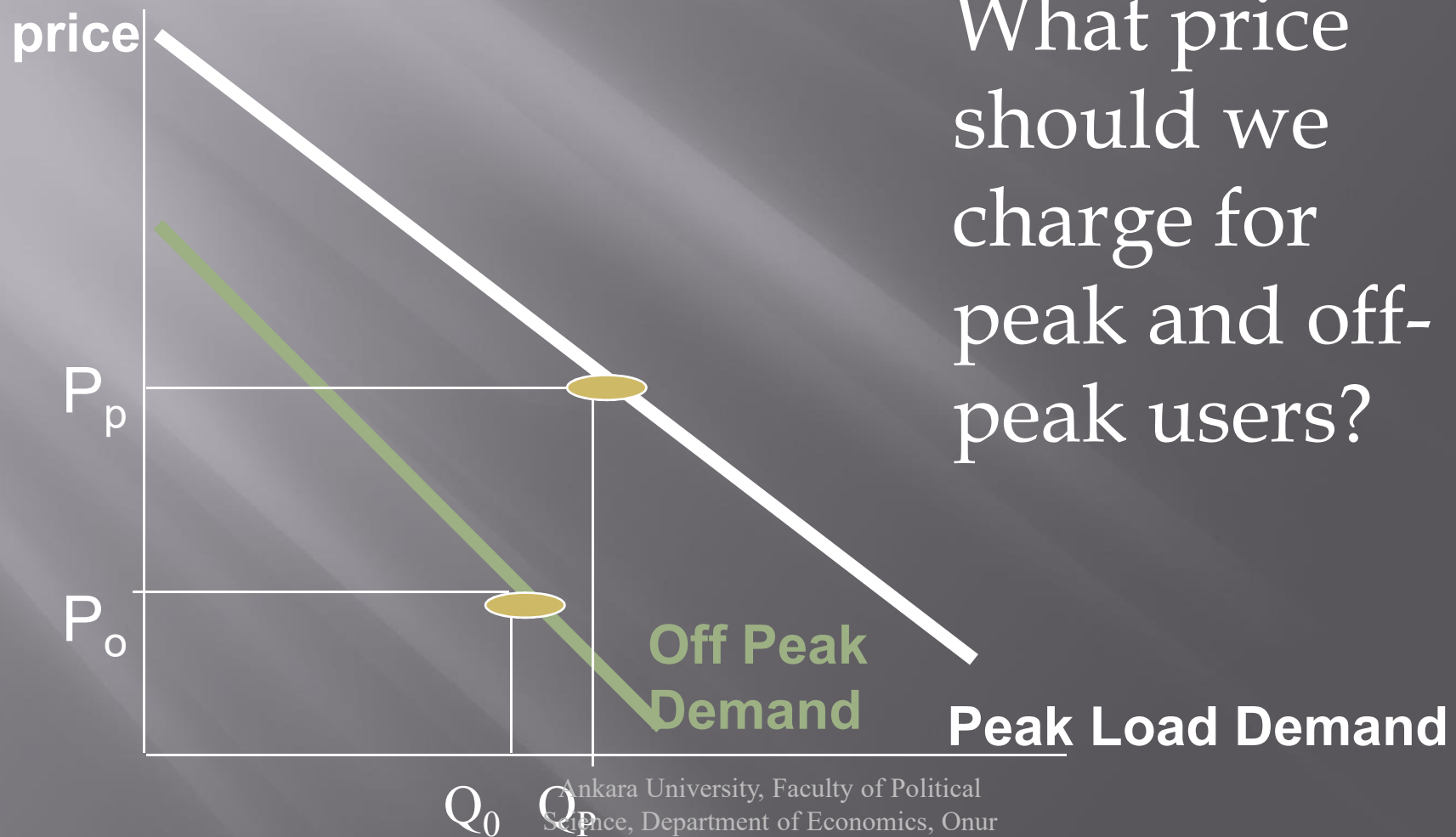
- Price declines, similar to the demand curve

P

D

Q
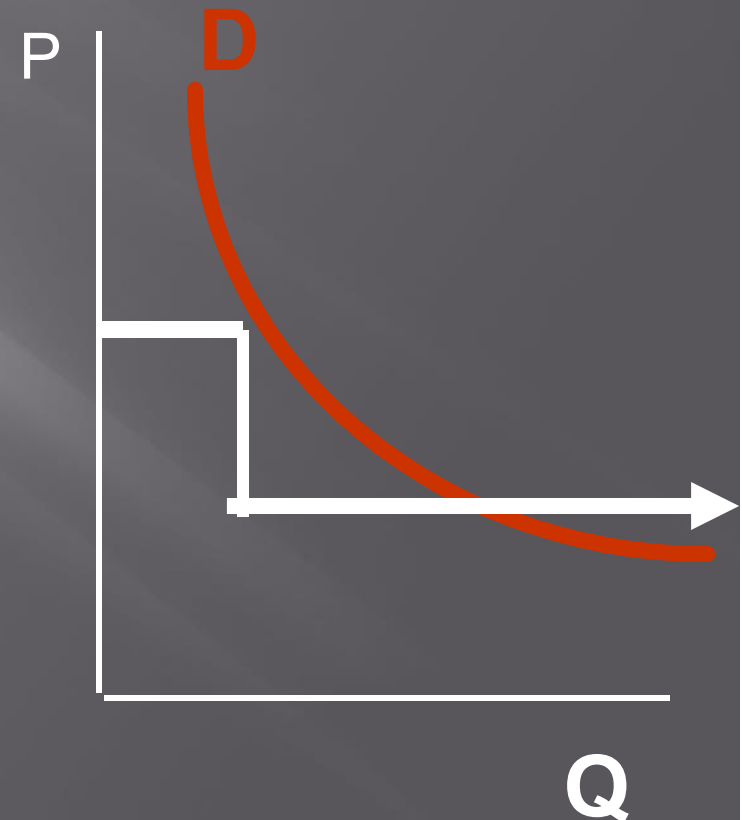
Peak Load Pricing

- *Examples:* Long Distance Calls, Electrical Prices, Seasonally Pricing at Amusement Parks

- **Conditions**

  - **Not Storable**
  - **Same Facilities**
  - **Demand Variation**

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Peak and Off-Peak Demand

price

P_p

P_o

Off Peak Demand

Peak Load Demand

Q_0 Q_p

What price should we charge for peak and off-peak users?

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General Solution

- **P(peak)** = variable costs + capital costs

- **P(off-peak)** = variable costs only

- Some argue that off-peak users benefit from capacity
  - Electrical Case: Less chance of a brown out
  - Amusement Park: Off peak users enjoy more space
  - Then, off-peak users should pay for some part of the capacity

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