Week 7. Monopoly

1. **Pure Monopoly Defined**

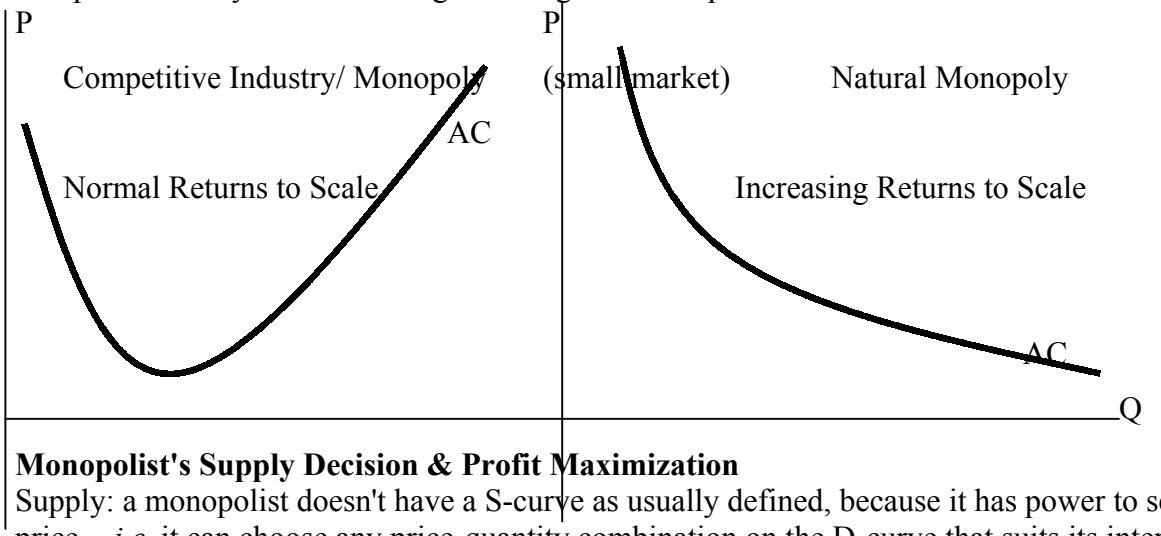
a. There is only one supplier of a product.
b. There are no close substitutes.
c. It is very hard or impossible for another firm to coexist.

2. **Causes of Monopoly: Barriers to Entry & Cost Advantage**

a. *Legal Restrictions* (*e.g.* licensing)
b. *Patents* to encourage inventiveness
c. *Control of a Scarce Resource or Input* (*e.g.* South African Diamond syndicate)
d. *Deliberately Erected Entry Barriers* (*e.g.* Lawsuits & Obscene amount of $ on advertising)
e. *Large Sunk Cost* - Naturally imposed entry barrier. (**natural monopoly**)
f. *Significant Cost Advantage* (**natural monopoly**) through
   i) Technical Superiority
   ii) Economies of Scale

3. **Natural Monopoly** is an industry in which advantages of large-scale production make it possible for a single firm to produce the entire output of the market at lower AC than a number of firms each producing a smaller quantity.

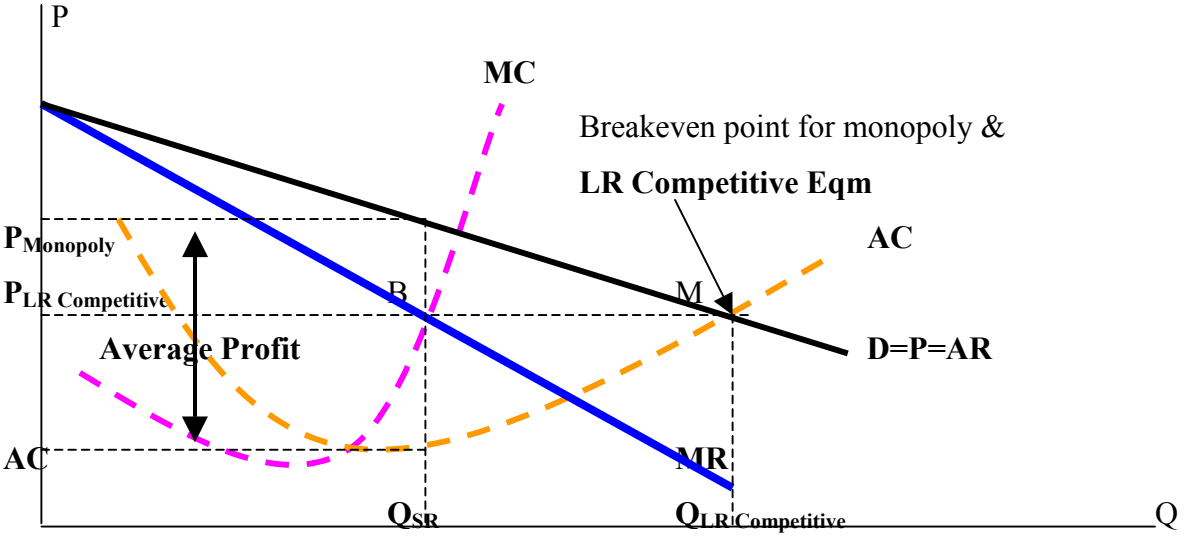
a. Its natural cost advantage may well drive the competition out of business. Once this is done, the firm may raise its price. That's why many public utilities are regulated. - *i.e.* it is preferable to permit these firms to achieve lower costs by having the entire market to themselves, and then subject them to regulatory supervision, rather than to break them up into a number of competing firms.
b. A monopoly need not be a large firm if the market is small enough. What matters is the size of a single firm relative to the total market demand for the product.
c. It is generally considered undesirable to break up a large firm whose costs are low because of scale economies. But barriers to entry are usually considered to be against the public interest except where they offer offsetting advantages such as patents.



4. **Monopolist's Supply Decision & Profit Maximization**

a. Supply: a monopolist doesn't have a S-curve as usually defined, because it has power to set price. - *i.e.* it can choose any price-quantity combination on the D-curve that suits its interests best.

b. Demand: Monopoly's D-curve is down-sloping, not horizontal like in perfect competition, because the firm is the industry in monopoly.



c. If a monopoly does earn a +ve profit, it may be able to keep on doing so in the LR.

d. Monopoly MR < P=AR=D, because when the firm cuts the price to attract new sales, al previous customers also benefit. Thus, MR when sale ↑ by 1 unit = Price from the new sale – Revenue loss from ↓Price. This means that MR is necessarily < Price.
i.e. MR = $Q_0Q_1BD - P_0P_1DA = \$2\times1 - \$.10\times15 = \$.50 < \$2$

e. *Slope of* $MR = 2\times$ *Slope of* $D = P\left(1-\frac{1}{e}\right)$, where e = point elasticity $= \frac{MN}{NC}\times\frac{NC}{ON} = \frac{MN}{ON}$.

i) If $\beta = 1$, $D = AR = P = \alpha - Q$. Then, (Fig. Next page)

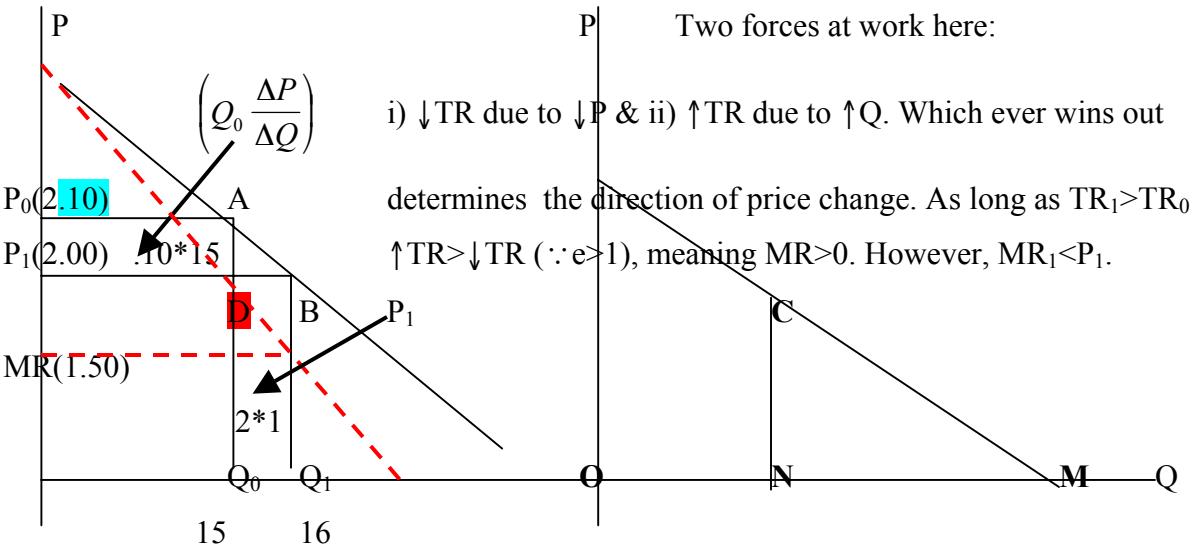
Then, $TR = PQ = \alpha Q - Q^2 \quad \therefore MR = \frac{\partial TR}{\partial Q} = \alpha - 2Q$

ii) Extra revenue from an ΔQ, *i.e.* $\frac{\Delta PQ}{\Delta Q}$, has two components. Producing one extra unit and selling it at P_1 brings in revenue of P_1, but it also results in a small drop in price, $\frac{\Delta P}{\Delta Q}$, which reduces the revenue by $\left(Q_0\frac{\Delta P}{\Delta Q}\right)$ from all units sold. Thus,

$MR = P_1 + Q_0\frac{\Delta P}{\Delta Q} = P_1 + P_1\left(\frac{Q_0}{P_1}\right)\left(\frac{\Delta P}{\Delta Q}\right) = P_1 + P_1\left(\frac{1}{e}\right) = P_1\left(1+\frac{1}{e}\right)$, where $e < 0$.

iii) **Cost-Plus Pricing**: From the profit maximizing condition, $MR = P_1\left(1+\frac{1}{e}\right) = MC$.

Therefore, $\frac{P_1 - MC}{P_1} = -\frac{1}{e}$, $P_1 = \frac{MC}{1+1/e}$, which provides the rule of thumb for pricing. (*cf.* Mark-up pricing: $m = \frac{P-C}{C} \rightarrow P = (1+m)C$)



Two forces at work here:

i) ↓TR due to ↓P & ii) ↑TR due to ↑Q. Which ever wins out determines the direction of price change. As long as $TR_1 > TR_0$ ↑TR>↓TR (∵e>1), meaning MR>0. However, $MR_1 < P_1$.

f. Determining Profit-Maximizing Output

To find monopolist's profit-maximizing point

i) Find the output at which MR=MC.

ii) Find the height of the D-curve at that level of output to determine the corresponding price.

iii) Compare the height of the D-curve with the height of the AC curve to check for profit or loss.

5. **Comparison of Monopoly & Perfect Competition**

a. Monopolist's Profit Persists if the monopoly is protected by entry barrier. (subsidies)

b. Monopoly Restricts Output to Raise SR Price. → Monopoly Q* < Competitive Industry Q*.

c. Monopoly Restricts Output to Raise LR Price. (Compare B & M on page2.)

d. Monopoly Leads to Inefficient Resource Allocation

i) Under perfect competition efficient resource allocation is achieved & it requires that MU = P = MC.

ii) Under monopoly MU = P, but P > MC = MR, so that MU > MC (∵more scarce the resource, higher the MU), which indicates that too small a share of society's resources is being used to produce the monopolized commodity → A monopoly firm may earn profit in excess of opportunity cost of capital. → Resources are allocated inefficiently by producing too little and charging too high.

6. **Positive Side of the Monopoly** (if a & b together)

a. Monopoly May shift Demand

i) D-curve will be the same as competitive industry D-curve if the monopoly does nothing to expand its market, but the monopoly may well advertise, whereas in perfect competition no single insignificant firm has incentives to advertise for homogeneous good.

ii) Advertising expenditure will shift the D-curve outward.

iii) The higher D-curve may induce ↑production → ↑MC & AC and therefore, reduce the difference (π) between competitive industry & monopoly, but the monopoly may charge higher prices, so the ↑output may not constitute a net gain for consumers.

b. Monopoly May Shift the Cost Curve.
   i) Advertising may ↑ MC & AC.
   ii) Sheer size leading to bureaucratic inefficiencies and coordination problems, too.
   iii) *Au contraire*, duplications unavoidable for small independent firms may be eliminated. → Large scale of input purchases by monopoly may permit quantity discount. → May lead to downward shift in MC curve. → Monopoly output / price will move up/ down closer the competitive level.

c. Monopoly May Aid Innovation
   i) Protected from rivals and therefore, sure to capture the benefits from any cost savings, monopoly has particularly strong motivation to invest in R&D.
   ii) If the R&D bears fruit, the monopolist's cost will be lower (∵ innovation increases efficiency & productivity for the same input. - *i.*e. Technology → economies of scale) than the competitive case in the LR.

d. Natural Monopoly
   i) Increasing returns to scale (economies of scale) warrants cost advantage. Therefore, breaking up natural monopoly into small firms would only result in higher cost. → Allowing the monopoly to exist may serve the society's best interest.
   ii) Then, regulating the monopoly would be necessary by placing legal limits on its ability to set price.

7. **2nd ° Price Discrimination under Monopoly**

a. Price discrimination is the sale of a given product at different prices to different customers, although there is no difference in the cost of supplying different customers. Prices are also discriminatory when all the customers are charged the same price although it costs more to supply one customer than another.

b. Price discrimination happens also in the competitive industry (*e.g.* Bargain airline tickets). → may lead to a price war (cream skimming).

c. When the firm charges discriminatory price, profits are higher.

P_X	Discriminate	Revenue	P_X	Don't discriminate	Revenue
$30	100 rich families	$3,000	Either $30	100 rich only (↓CS)	$3,000
$10	1,000 poor ones	$10,000	Or $10	1,100 all (No loss in	**$11,000**
Total	Win all C.S. w/o hurting revenue.	**$13,000**	Difference	CS, but lower revenue)	**$8,000**

   i) Nondiscriminatory Pricing: If the cost of producing additional 1,000 units for the poor < $8,000 of added revenue from sale s to the poor, then $10 price is more profitable.
   ii) Discriminatory Pricing: Preventing the poor from reselling at a slight mark-up their low-priced merchandise to the rich (parallel import), the revenue obtainable would be $13,000.
   iii) Discriminatory pricing is clearly a better deal in this case, because the maximum TR under discrimination > the maximum TR under non-discrimination.

d. **Determining the Profit-Maximizing 3rd ° Discriminatory Prices**

$$MR_A = MR_B$$

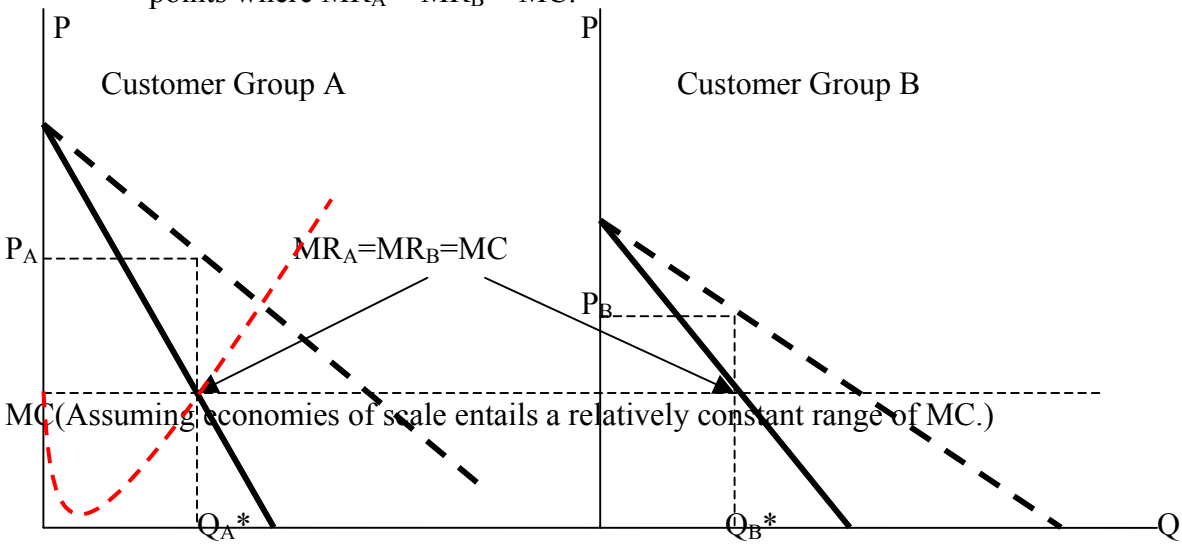
i) If $MR_A > MR_B$, the firm will sell to Group A customers until $MR_A = MR_B$ & *vice versa*.

ii) If the firm is selling Q_A to Group A, Q_B should be the level that yields the same MR as Q_A does.

iii) If the MC is the same whether supplied to Group A or Group B, then

$$MR_A = MR_B = MC.$$

iv) To determine the profit-maximizing outputs & prices graphically, draw the pertinent MC as a horizontal line if MC is constant (assuming economies of scale), and find the points where $MR_A = MR_B = MC$.



Prices and Quantities under Price Discrimination

e. Upside of Price discrimination

i) Same first class postage for mails going to different destinations.

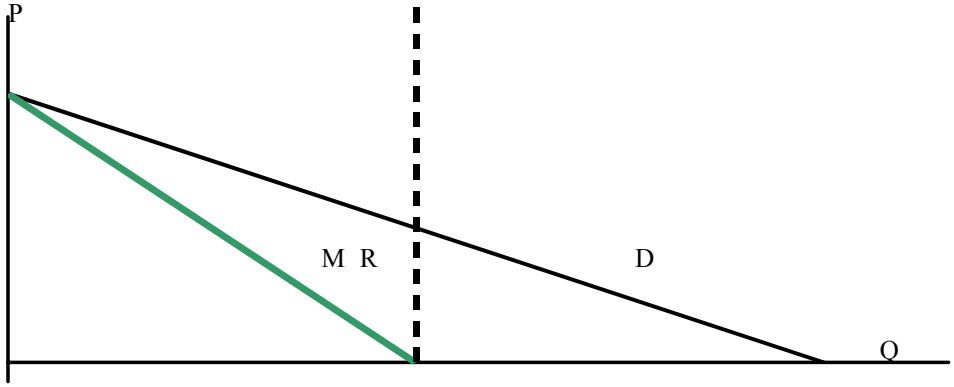
ii) Discount tickets for seniors & students.

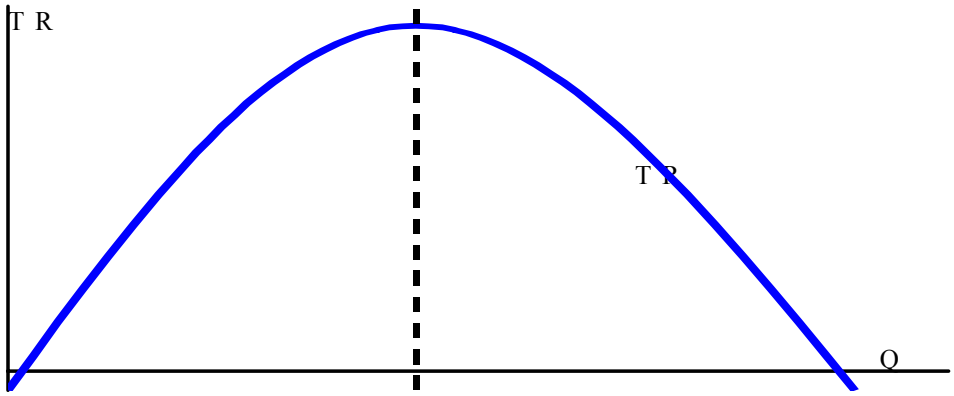
iii) Lower doctor's fees for needy patients

iv) When it is impossible for a private firm to supply the product w/o discrimination. Any uniform price will drive the firm out of business.

P_X	Don't discriminate	**Cost >**	**Revenue**
Either \$30	100 rich only	**\$4,000**	**\$3,000**
Or \$10	1,100 all	**\$11,500**	**\$11,000**
Difference			**\$8,000**

v) Price discrimination might even make a product cheaper to even those who pay higher prices if there are significant economies of scale. This is because the firm can offer lower prices to certain customers, → thereby attracting some businesses that would otherwise not have been. → The output will, therefore, increase. → Scale economies will reduce MC. → Lower MC will benefit even the high-priced customers. (This is possible b/c lower MC may shift the profit-maximizing output level resulting in lower price necessarily at that output level.)





$TR = PQ = Q(\alpha+\beta Q) = \alpha Q+\beta Q^2$, where $\beta<0$.