Laxmi Narain Dubey College, Motihari
(a constituent unit of B.R.A. Bihar University, Muz.)
NAAC Accredited 'B+'
Department of Economics

Topic: Monopoly

Paper-I: MICROECONOMICS
Part-I
B.A. (Hons.)

Instructor
Durgesh Mani Tewari
Assistant Professor
dmtewari@gmail.com

MONOPOLY

Definition: Monopoly is a market structure where there is a single seller of the good in the market with no close substitutes. There is very little competition with the firm exercising a great deal of control over the price of the good. Also, there exist barriers to entry.

Characteristics

i. **Single seller of the goods:** There exists a single seller, who exercises control over the output of the whole industry. Thus, the firm constitutes the industry.
ii. **No goods which can act as substitutes:** As far as specific goods are concerned, the entire output of the goods is produced by the monopoly firm. There are no other goods, which can substitute the said specific goods. Thus, the firm has control over the price of the goods or it acts as a price maker.
iii. **Restrictions on entry:** There exist barriers as far as entry is concerned, for example, patents. This is necessary for a monopoly firm to survive in market.
iv. **Monopolist has perfect knowledge**: The monopolist has perfect knowledge about the conditions in the market. There are no uncertainties in the market about the future conditions.
v. **Goal of the firm is to maximise the profits:** The monopolist firm aims at maximising its profits.

FIRM'S REVENUE CURVES UNDER MONOPOLY

Demand curve

- ✓ Under monopoly, there exists a single seller who exercises control over the output of the whole industry. Thus, the firm constitutes the industry.
- ✓ Hence, the demand curve of the firm is also the demand curve of the industry.
- ✓ Since the firm has control over the price of the goods or is a price maker, the demand curves lopes downwards.
- ✓ It is important to note that though the firm is a price maker, it may either fix the price or the output of the goods, but cannot fix both.
- ✓ We assume a demand curve given by the equation, $P = a - bX$
  where, 'P' is the per unit price of the good, 'a' is the intercept of the demand curve on the Y axis, 'b' is the slope of the demand curve, and 'X' is the quantity of the goods or the output level.

Revenue curve

- ✓ A firm can have three kinds of revenue curves under a monopoly.

1. ***Total revenue curve:*** TR can be defined as the total proceeds earned by a firm from the sale of a certain amount of the output. Thus,

$$\boldsymbol{TR = P \times X}$$
$$\boldsymbol{TR = (a - bX)\, X}$$
$$\boldsymbol{TR = aX - bX^2}$$

Under monopoly, the TR curve is an inverted U-shaped curve.

2. ***Average revenue curve:*** AR can be defined as the average proceeds earned by a firm from the sale of a certain amount of the output. Thus,

$$AR = \frac{TR}{X}$$
$$AR = \frac{PX}{X}$$
$$AR = P$$
$$AR = a - bX$$

where, AR is average revenue.

- ✓ So, the AR is the price of the goods. The average revenue curve is also the demand curve for the goods.

3. ***Marginal revenue curve:*** MR is the change in the TR when the output changes by one unit.

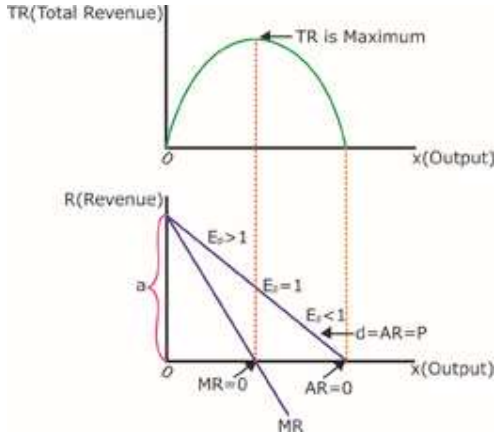
$$TR = aX - bX^2$$

$$MR = \frac{\partial TR}{\partial X}$$

$$MR = \frac{\{\partial(aX - bX^2)\}}{\partial X}$$

$$MR = a - 2bX$$

Or, $MR = TR_N - TR_{N-1}$



Demand Curve, Total Revenue Curve, Average Revenue Curve, and Marginal Revenue Curve

In this figure, the MR curve is shown as a straight line, which begins from the same point on the Y axis as the AR curve.

RELATIONSHIP BETWEEN AVERAGE REVENUE, MARGINAL REVENUE, AND ELASTICITY OF DEMAND

Let,

$$\boldsymbol{TR=P\times X}$$

$$MR= \partial TR/\partial X$$

$$MR= \partial(P\times X)/\partial X$$

$$MR=P\ \partial X/\partial X +X\ \partial P/\partial X$$

$$\boldsymbol{MR=P+X\ \partial P/\partial X}$$

Since,

$$Ep = -\partial X/\partial P \times P/X$$

$$\partial P/\partial X = -1/Ep \times P/X$$

$$MR=P+X(-1/Ep \times P/X)$$

$$MR=P\{1- 1/Ep\ \}$$

It is obvious from the equation that:

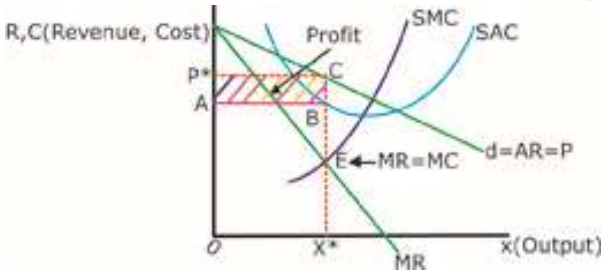
i. ***If $E_P < 1$, demand is relatively inelastic:*** When price elasticity of demand is < 1, change in the quantity demanded is less than proportionate to the change in the price of the good. Thus, TR decreases as price decreases. This implies that MR is negative.

ii. ***If $E_P = 1$, demand has a unitary elasticity:*** When price elasticity of demand is equal to one, change in the quantity demanded is in the same proportion to the change in the price of the good. Thus, TR does not change as price decreases. This implies that MR is zero.

iii. ***If $E_P > 1$, demand is elastic:*** When price elasticity of demand is >1, change in the quantity demanded is more than proportionate to the change in the price of the good. Thus, TR increases as price decreases. This implies that MR is positive.

SHORT-RUN EQUILIBRIUM OF THE FIRM

- ✓ The objective of the monopoly firm is to maximise the profits:
- ✓ ***Total revenue-Total cost approach:*** When the difference between TR and TC is a maximum, profits are a maximum.
- ✓ ***Marginal approach:*** When MR = MC and the MC curve intersects the MR curve, profits are at maximum.
- ✓ The marginal approach to equilibrium for a monopoly firm has been depicted diagrammatically in the following figure.
  - The firm's demand curve, d, is downward sloping. It is also the firm's AR curve.
  - The SRAC curve of the firm is represented by the curve, SAC. It is U-shaped due to the law of variable proportions.
  - The SRMC curve of the firm is represented by the curve, SMC. It is also U-shaped due to the law of variable proportions. It cuts the SRAR curve, SAC at its minimum point.

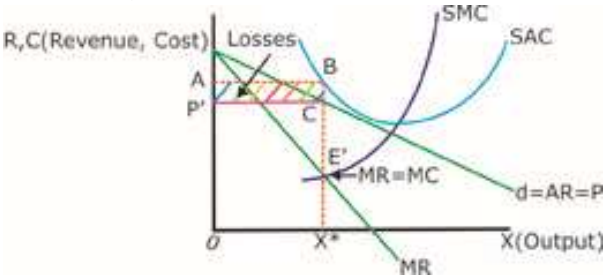


Monopoly Firm Making Supernormal Profits in the Short Run

- ✓ The firm is in equilibrium at the point where MR=MC and also the MC curve intersects the MR curve from the related figure.
- ✓ The firm is in a position to earn supernormal profits equal to the rectangle P*ABC.

Monopoly Firm Incurring Losses in the Short Run

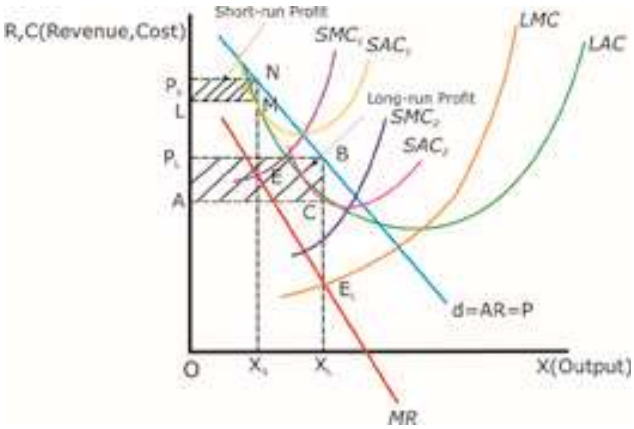
It is not necessary that a monopoly firm will make supernormal profits in the short run.
The following figure depicts a firm which is making losses in the short run.
The firm is in equilibrium at point E'. The equilibrium price is OP' and the quantity is OX'. The price OP' does not cover the average fixed costs of production.
Thus, the firm will incur losses equal to the rectangle P'ABC.
The firm will continue to produce as long as it covers the AVC.



Monopoly Firm Incurring Losses in the Short Run

LONG-RUN EQUILIBRIUM OF THE FIRM

- ✓ The rules for profit maximisation in the long run are the same as for the short run.
- ✓ However, in the long run, a monopolist is able to expand the firm's size so as to be able to increase its profit in the long run.
- ✓ The marginal approach to equilibrium for a monopoly firm has been depicted diagrammatically in the figure.



Monopoly's Long-Run Equilibrium

  - The firm's demand curve, d, is downward sloping. It is also the firm's AR curve.
  - The firm's MR curve is a straight line, which falls at a greater rate than the AR curve.
  - The SRAC curves of the firm are represented by the curves SAC_1 and SAC_2. They are U-shaped due to the law of variable proportions.
  - The SRMC curves of the firm are represented by the curves SMC_1 and SMC_2. They are U-shaped due to the law of variable proportions.
  - The LRAC curve of the firm is represented by the curve, LAC.
  - The LRMC curve of the firm is represented by the curve, LMC.
- ✓ The firm is in a ***short equilibrium*** at point E_S, where MR = SMC_1 and also the SRMC curve intersects the MR curve from below.
- ✓ The equilibrium price is OP_S while the equilibrium output is OX_S.
- ✓ The firm is earning supernormal profits equal to the rectangle P_SLMN.
- ✓ The firm is in a ***long-run equilibrium*** at point E_L, where MR = LMC and also the LRMC curve intersects the MR curve from the relevant figure.
- ✓ The equilibrium price is OP_L while the equilibrium output is OX_L.
- ✓ The firm is earning supernormal profits equal to the rectangle P_LACB.

A ***comparison of the short- and long-run equilibrium*** of the monopolist depicts that:

i. The long-run equilibrium output OX_L is larger than the short-run equilibrium output OX_S.
ii. The long-run equilibrium price OP_L is lower than the short-run equilibrium price OP_S.
iii. The long-run monopoly profit P_LACB is larger than the short monopoly profit P_SLMN.

- ✓ Thus, the monopolist produces a larger output at a lower price and earns larger profits in the long run than it does in the short run.

PRICE DISCRIMINATION

- ✓ Price discrimination is a situation when different prices are charged for different consumers for the sale of the same good at the same point in time.
- ✓ A monopoly that practices price discrimination is called a discriminating monopoly.

Conditions Necessary for Price Discrimination

For price discrimination to be implemented, the necessary conditions are as follows:

a) ***Imperfect competition always stays in the market.*** Only under a situation like monopoly, it is possible for a firm to charge the different prices from the different consumers.

b) ***It is necessary that two or more markets exist***, which are separated from each other. Otherwise, a consumer in one market may indulge in reselling the goods in the higher-priced market at a higher price.

c) ***The price elasticity of demand must be different in the different markets***. This is because if the elasticity is the same, then the price discrimination would lead to a fall in the profits by causing a decrease in demand in the higher-priced market.

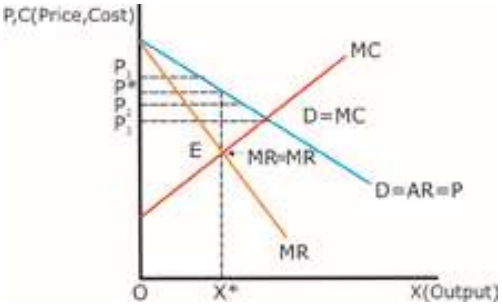
d) ***The MR in each market should be greater than the MC of the monopoly good***.

Degrees of Price Discrimination

- ✓ The degree of price discrimination is the limit to which a firm can make a division of the markets and extract the surplus from the consumers.
- ✓ There are three degrees of price discrimination.

1. ***First degree price discrimination:*** Here, the monopolist charges the maximum price that each consumer is willing to pay for every unit of the goods. Thus, he is able to extract the whole of the surplus from the consumer. The problem that may occur is that often the firm may not be aware of the maximum price that each consumer is willing to pay.

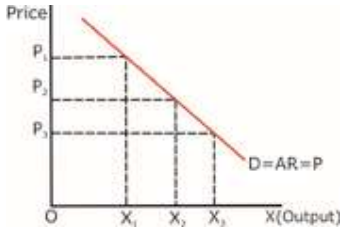
   In the figure, if there had existed a simple monopoly, the monopolist would have charged a single price OP^* selling OX^* units of the good. Under first degree price discrimination, the monopolist will charge different prices OP_1, OP_2, and OP_3. The minimum price, which he would be ready to accept, would be OP_3 determined at the level, where the MC curve intersects the demand curve.



First Degree Price Discrimination

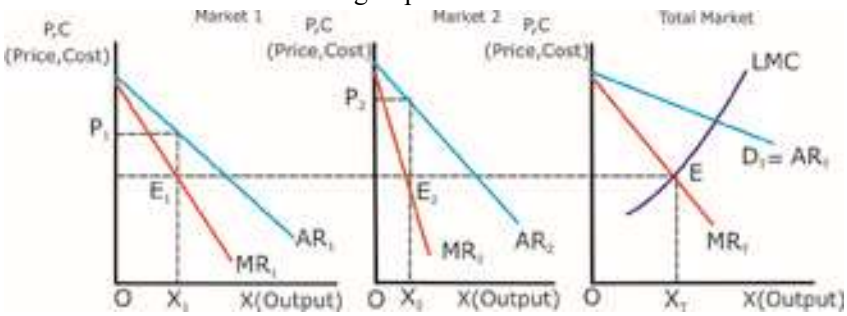
2. ***Second degree price discrimination:*** This is also called the block pricing method. Here, the monopolist divides the different markets into sub-markets or blocks charging a different price from each block. The basis on which the market is sub divided is according to the quantity bought in each market. The price in each block is determined by what the marginal unit in that block is able to pay.

   In the following figure, the market has been sub-divided into three blocks. The monopolist charges the highest price OP_1 for OX_1 units, which forms the first block; price OP_2 for OX_2unitswhich forms the second block; and price OP_3 for OX_3unitswhich forms the third block. Thus, the monopolist is able to extract a considerable part of the consumer's surplus.



Second Degree Price Discrimination

3. ***Third degree price discrimination:*** Here, the monopolist divides the consumers of the good into different sub-markets or different groups and charges a different price from each one of them. The market may be divided on the basis of some geographical or demographic features. The important point to note here is that for third degree price discrimination to be possible, the price elasticity of demand should be different in each sub-market or group.



Third Degree Price Discrimination

- In Figure (a) here, AR_1 and MR_1 are the AR and MR curves, respectively, of Market 1.
- In Figure (b), AR_2 and MR_2 are the AR and MR curves, respectively, of Market 2.
- In Figure(c), the total AR curve AR_T is the horizontal summations of AR_1 andAR_2 while the total MR curve MR_T is the horizontal summations of MR_1 and MR_2. MC, the firm's MC curve, intersects the total MR curve MR_T at point E to determine the monopolist's equilibrium output at OX_T.

✓ Since the monopolist aims at profit maximisation, he will allocate the output in the two markets such that the equilibrium of equality between marginal revenue and marginal cost is satisfied in both the markets.

✓ A horizontal line is drawn from point E in Figure(c), parallel to the X-axis, which intersects MR_1 at point E_1 and MR_2 at point E_2.

✓ Thus, the monopolist will maximise his profits in Market 1 by selling an output of OX_1 at a price of OP_1 and in Market 2 by selling an output of OX_2 at a price of OP_2. It is important to note that $OX_T = OX_1 + OX_2$.