Paper : Introductory Microeconomics

Unit V- Monopoly and the Policies of the Government

Lesson: Monopoly and the Antitrust Policies of the Government

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Monopoly and the Antitrust Policies of the Government

Learning Outcome

We are going to analyse monopoly market here. After reading this chapter one would be able to answer questions like what is monopoly, how it arises, what makes monopoly different from competition, what government does to control the problem of monopoly? One would also be able to answer about price discrimination and the inefficiency caused by monopoly. In this chapter we try to explain monopoly industry with the use of both hypothetical data and diagrams, which would make the concepts more clear.

Monopoly

An industry with a single firm that is the sole seller of the product for which there are no close substitutes and having the barriers to entry. There are key characteristics of monopoly: - single seller, no close substitute, barriers to entry… It's a type of imperfect competition. They are the price makers.

Why they arise or factors leading to Monopoly

Barriers to entry are the most important reason for the birth of a monopoly. A monopoly firm is the only seller in the market of its product and no close substitute exist for its product. As no other firm is allowed to enter the market, that gives them the monopoly over that product. Barriers to entry are something that prevents any new firm to enter and compete within the monopoly market. They can be natural or man-made barriers. Following are the reasons behind it:

Government created Monopolies: Many a time monopoly arises because of government directives i.e. sometimes government grants some firm the exclusive right to provide some goods or services. They reason that it is efficient and in public interest to provide these rights. For instance, Indian Railways is a classic example. It's a government monopoly in India; they are the sole provider of railway services in the country. But sometimes monopoly also arises because of strong lobbying and political nexus between the firm and the politicians.

Patents and Copyright Laws: It is another way of creation of monopoly by the Government. Government provides exclusive rights to the inventor for the use of the product or a process. For instance Patent granted to any Pharmaceutical company for discovering a new drug for say 25 years provide them with the exclusive right to produce that drug and sell that drug for that period of time in the market. It prevents any other company to produce similar drug. Similarly, copyright rights provide an author the exclusive rights to sell his book alone. They act as a stimulus for innovations and discoveries or any new original work. It's a reward for an extensive research through which some new knowledge or new products are developed.

Monopoly Resources: Ownership of a scarce factor of production is another factor leading to monopoly. A classic example of such a monopoly is De Beers, the South African diamond company which controls about 80% of the world production of diamonds. But Exclusive ownership of resources by one firm or a person is very rare.

Natural Monopoly: When an entire market demand for the good or services can be met by one single firm at lower cost than could be when more than one firm. It arises when there are economies of scale associated with the output level. It usually arises in that industry where production requires a very high fixed cost and a negligible marginal cost relatively. For instance oil and gas pipelines, as there construction requires a huge fixed cost while cost of supplying an extra unit of oil is negligible. So, it is better that a single firm should produce output at least cost, as with more firms output produced per firm is less and cost will be more. Natural monopoly also depends on the size of the market. It is possible that as market size increases the monopoly give way to the competitive market. In figure 1, we can see Monopoly arises because of economies of scale. When a firm's ATC continually decline, the firm has what is called natural monopoly. In such cases it's better that only one firm produce entire output at the least cost.

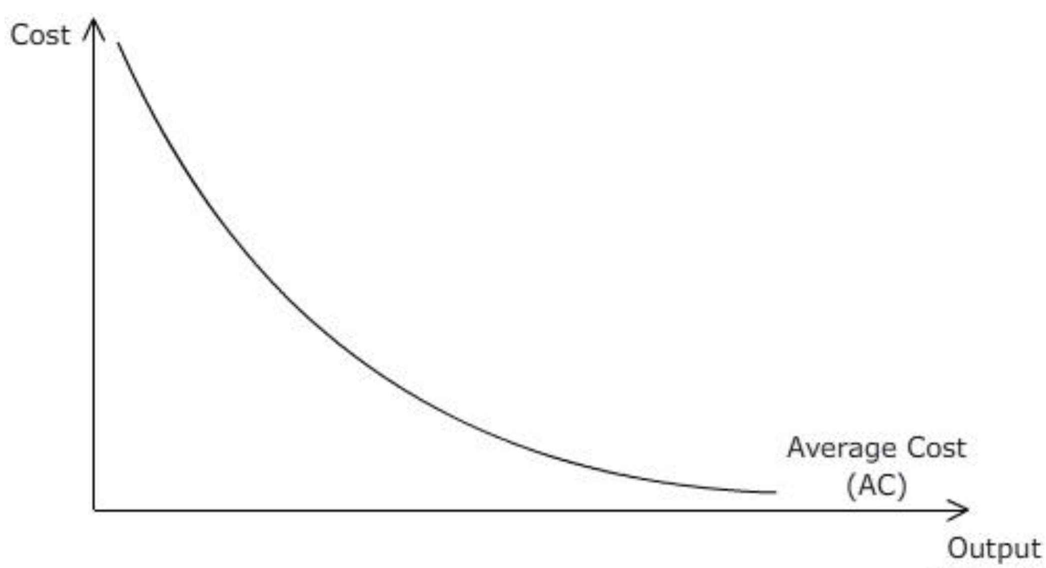

Fig. 1 : Economics of Scale as a Cause of Monopoly

Pricing and Output decision of Monopoly

Let’s see how monopoly makes the decision regarding pricing and production of a good. In perfect competition as there are many firms so they take prices as given i.e. they have no power to influence the prices but in monopoly, firm is the price maker. Monopoly is the single seller of that product which gives them the power to set the prices. Competitive firms are ready to supply whatever is demanded at that price, there demand curve is horizontal at that price level. Monopoly faces a downward sloping market demand curve because in order to sell more quantity of output they have to reduce its price as only at lower prices people will be ready to purchase more. Monopoly cannot decide both the prices and quantity. Either they can adjust the quantity produced and let price be determined along the demand curve or vice versa. That is the reason why monopoly does not have a supply curve.

We assume monopolist choose to maximize profits. Now let’s see what point at demand curve, monopolist chooses to produce. Consider an arbitrary example of a monopoly’s revenue in Table 1. Here first and second column represent monopolist quantity supplied and the corresponding price level respectively. Looking at them we can understand that for monopolist to sell more commodities, price need to be reduced. For instance, first unit of quantity can be sold at Rs. 16 while second unit is sold at Rs.14 and third unit at Rs. 12… Total Revenue is the product of quantity sold and price charged for it. AR is the revenue per unit. MR is the marginal revenue, it is that amount of revenue which a monopolist earned by selling an extra unit. In mathematical terms, it is the difference between revenue in nth period and n-1th period.

By looking at the table we can easily find that AR=Price at each level of quantity produced. We can also observe that in the case of monopoly firm, MR is always less than the Price. And the reason is downward sloping demand curve. In other words MR< Price because for selling an extra unit of quantity say from second unit to third unit in the table, TR increases but by less than how much it got increased by selling second unit. Monopolists have to reduce the prices for selling an extra unit that to not only on extra unit sold but also on all previously selling units which will result in the fall of TR.

Table 1: Total Revenue, Average Revenue and Marginal Revenue				
Quantity	**Price**	**TR**	**AR**	**MR**
(1)	(2)	(3=2x1)	(4=3/1))	(5= TR_n-TR_{n-1})
0	18	0	-	-
1	16	16	16	16
2	14	28	14	12
3	12	36	12	8
4	10	40	10	4
5	8	40	8	0
6	6	36	6	-4

In figure 2, demand curve shows how the quantity and the price are related. Market demand curve of a monopoly is downward sloping because more can only be sold at lower prices. It can be seen MR curve lies below demand curve (AR curve) because to increase quantity price must fall on all units. MR become negative, when in order to sell an extra quantity led price to fall by enough such that TR starts declining. Both demand curve and MR curve start at the same point indicating that MR and price of the good are same for the first unit sold.

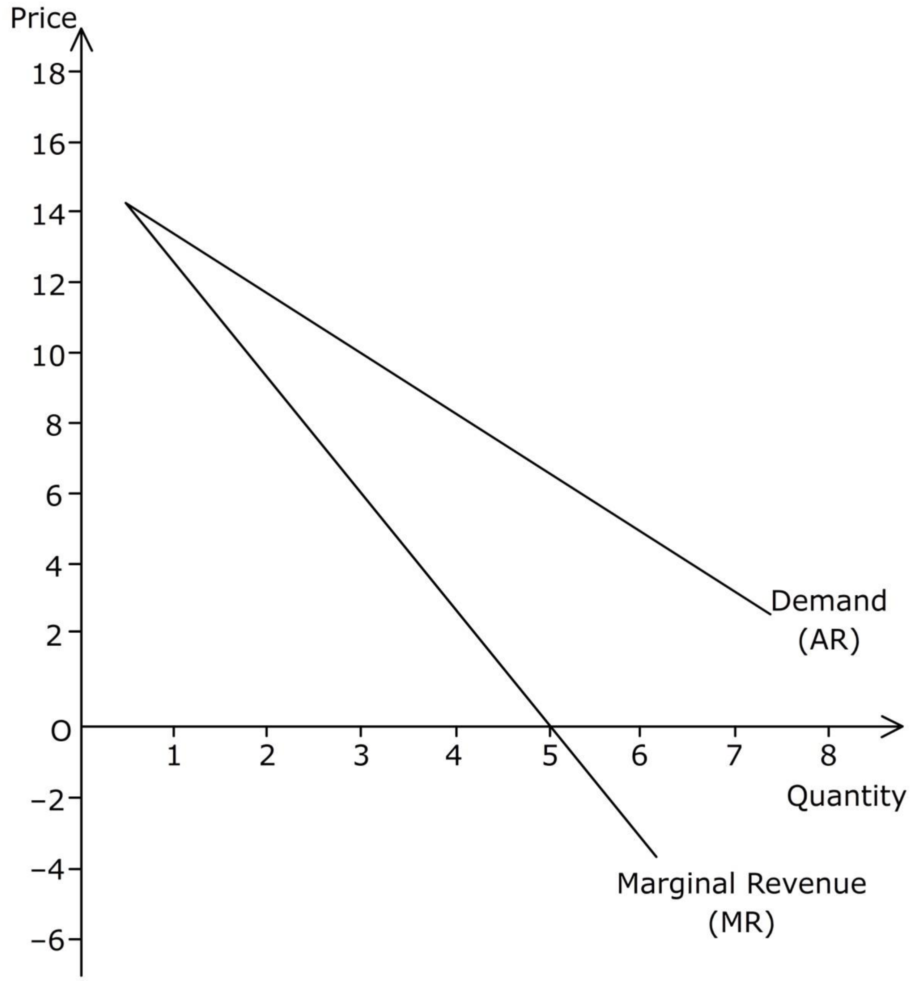

Fig. 2 : Demand & Marginal Revenue curve for a hypothetical Monopoly firm

Profit maximization for a monopoly

a monopoly will always choose to produce that level of output where its marginal revenue is equal to the marginal cost. In other words, the monopolist's profit maximization level of output is determined at the intersection point of MR and MC curve. In Perfect Competitive firm, P=MR=MC at the profit maximizing level of output.

Whereas in a monopoly firm, P>MR=MC at the profit maximizing level of output.

In case of a monopoly firm, if MR>MC, they will produce more and in case MC>MR, they will reduce their output level to increase their level of profits.

In figure 3, quantity produce is at horizontal axis whereas price and cost at the vertical axis. Profit maximizing level of price and output is (P*, Q*) where MC curve intersect MR curve from below. Monopoly will sell Q* unit of output at price P*

Profit= area (ABCD)=(P*-ATC)X Q*

In perfect competitive firm if positive profits appear, those will be drowned by the entry of new firms whereas in monopoly as there are barriers to entry which protect their profits from falling.

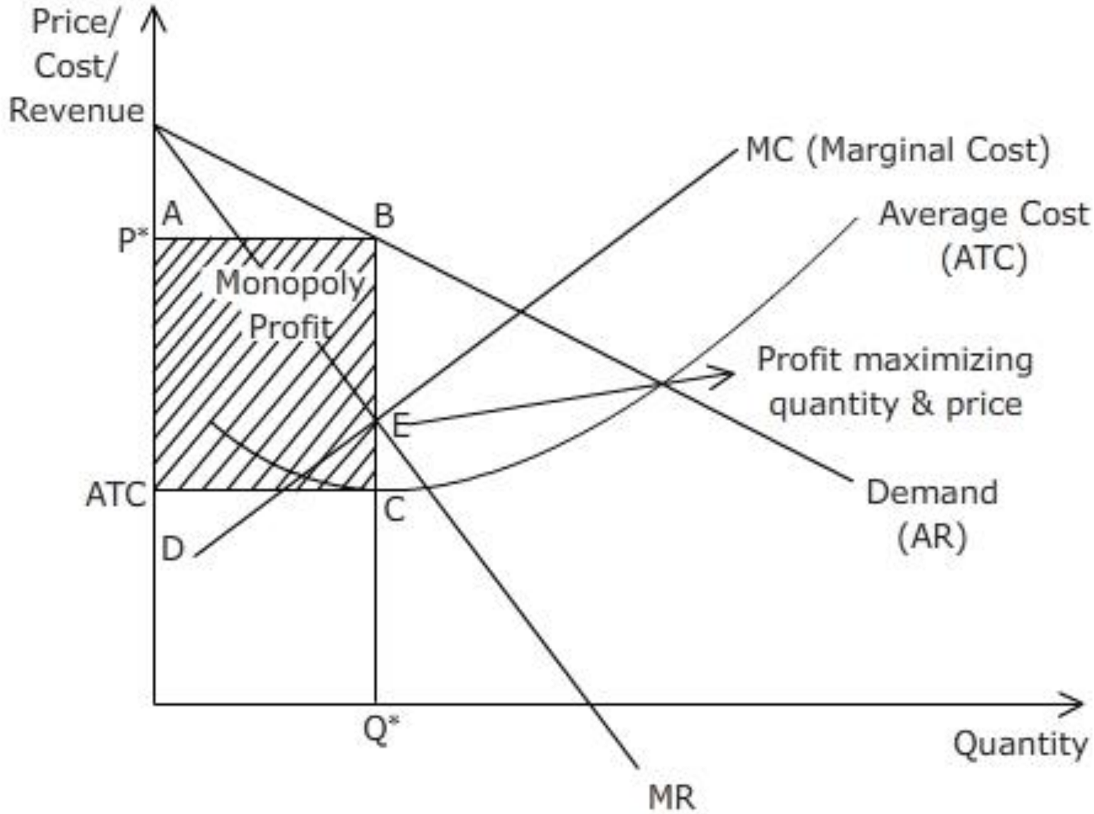

Fig. 3 : Profit maximization for a Monopoly

Important Note: Monopoly firm does not have supply curve. In perfect competition, supply curve is the upward sloping part of MC curve that lies above the AVC curve. How much to produce in perfectly competitive firms depend on the adjusting MC as price changes. However the amount of good produced by a monopoly depends on both its MC curve and the demand curve it faces as they set both prices and quantity.

Welfare Cost of Monopoly

Does monopoly lead to that level of output which leads to increase in the welfare of the entire society? It is undesirable to consumers, as they charge higher prices for the output they produce and it's beneficial for the producer as they could charge a higher price. So whether the total surplus increases or decreases tells us about the welfare of the entire society.
Total surplus is the sum of consumer's surplus (CS) and producer surplus (PS). Consumer's surplus is the difference between what consumers are willing to pay and what they actually

pay. Producer's surplus on the other hand, is the difference between what producers get and cost of producing that good.
In perfectly competitive firm, output is produced where P=MC, so market leads to the best allocation of resources. Thus, total surplus (TS) is as large as possible.

Deadweight loss

A benevolent social planner always tries to maximize total surplus. He always chooses that level of output where demand curve (AR curve) intersects MC curve. Demand curve represent value to the consumer and marginal cost represent cost at the margin. So, for social planner most efficient level of output would be where P=MC. So, we can say monopoly doesn't produce efficient level of output as they produce where P> MC=MR. So, in monopoly price doesn't reflect the true cost of production. Consumer wouldn't be able to buy efficiently.
Deadweight loss measure the loss in the efficiency caused when monopoly produces output less than the efficient level of output. Monopoly as compared to perfect competition produces less and charges high prices. It is the area of triangle between the demand curve and the MC curve. The loss is basically due to the fact that they charge prices which are more than MC. So, in this case those consumers, who are ready to purchase output at more than the MC but less than the actual price level, couldn't purchase output. Thus monopoly pricing power leads to the Deadweight loss. They actually by charging high reduces the size of the total surplus, by keeping some potential consumer out of the market.
In figure 4, quantity produced and supplied is on the x axis and price and cost on the y axis. P_m, P_c and Q_m and Q_c represent the prices charged and the quantity produced by monopoly and competitive firm respectively. We can observe that $P_m > P_c$ and $Q_m < Q_c$, which shows that a monopoly firm charges more and supply less quantity to the market. Downward sloping MR curve is the marginal revenue curve of the monopoly. MC is the marginal cost curve and DD is the demand curve. So, where MC curve intersect demand curve (AR=P) we get competitive market equilibrium price and quantity. Now, where MC intersect MR curve from below that determines the equilibrium level of price and quantity produced by monopoly. The triangle ABC represents the deadweight loss of the monopoly firm.

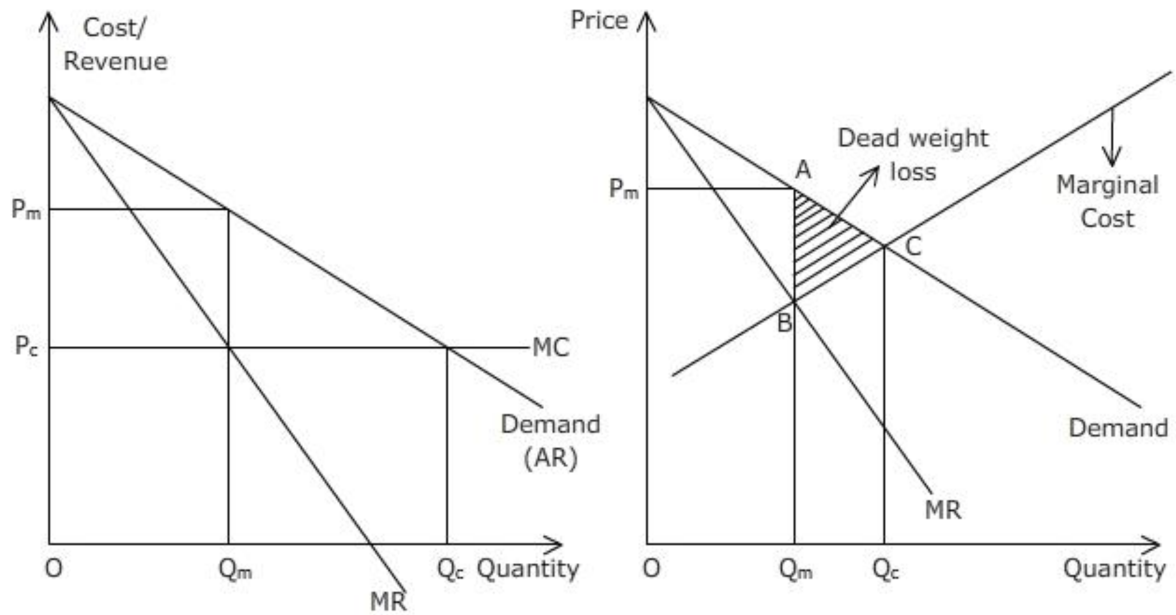

Fig. 4 : a) Comparing Perfectly Competitive & Monopoly output level
b) Dead-weight loss in Monopoly

Public Policies towards Monopolies

Monopolies lead to inefficient allocation of resources i.e. monopoly produces less than socially desirable and charges more than MC. Policymakers recommends some policies which help in reducing the level of inefficiency cause by the monopoly. They do following:

a) **Antitrust laws**: by creating Antitrust laws to curb Monopoly power. Antitrust laws are those laws that are used by the policymaker in the government to promote more competition and restrict market power. Famous Antitrust laws are Sherman Act of 1890; Clayton Act and Federal trade Commission Act, in which competition was used as a tool to control monopoly power rather than regulation or public ownership.

b) **Regulation**: by regulation we mean regulating the behaviour of monopolists. It is very commonly used in public utility companies. Government agencies regulate their prices. Usually, natural monopolies are found in the public utility companies. What price needs to be charged by natural monopolies is a very tedious question? If price is set equal to MC then monopoly will end up with losses. Natural monopolies have falling AC curve because it involves huge fixed cost and negligible MC, which imply that if P=MC, then at that price, MC<AC. Monopoly have to face huge loses at price P=AC, so they will prefer to exit in the long run. Secondly, MC pricing will give monopolist no incentive to reduce cost. Reduced cost mean higher profits but if with reduced cost regulators reduce the prices also, then monopolist receive no benefits. In figure 5, MC pricing for a natural monopoly is shown.

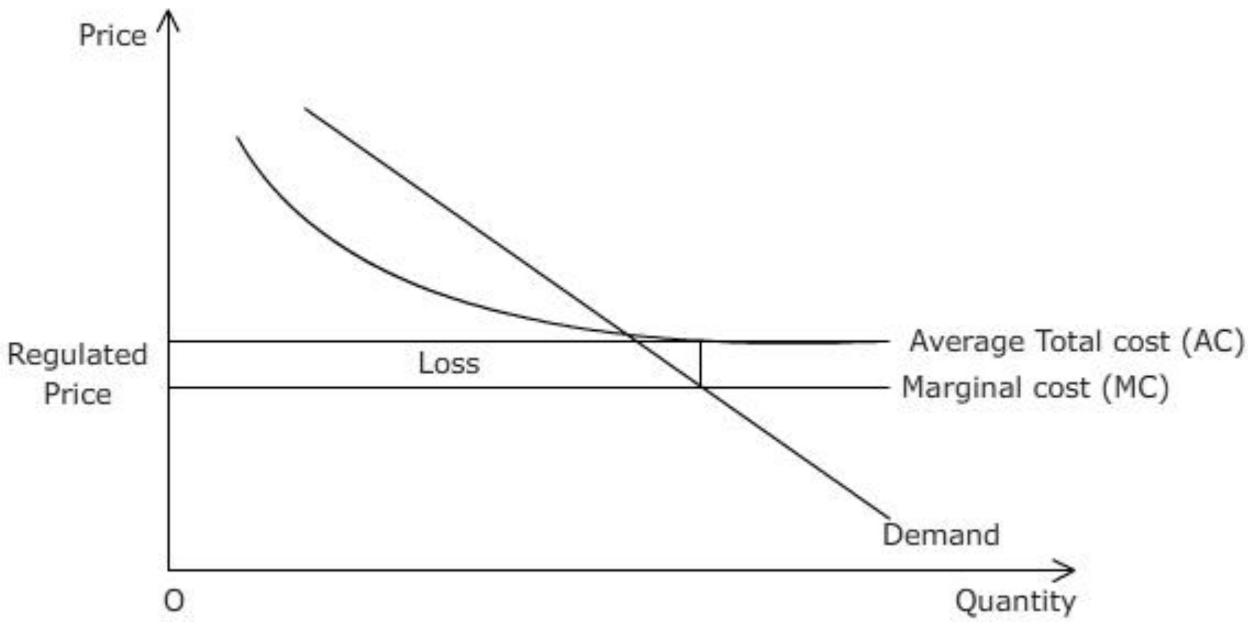

Fig. 5 : MC pricing for a Natuaral Monopoly

Now to get rid of these problem policymakers can do two things to solve this problem. Either they subsidize the monopolist or they can let monopolist to charge more than MC say AC pricing. Both of the condition will lead to Deadweight loss (DWL). In both the pricing mechanism inefficiencies will arise. So, in such a condition it would be better to let monopoly keep some positive benefit from lowering cost which acts as an incentive but for this prices must be charged more than MC.

c) Public Ownership: Government sometimes also use public ownership to reduce inefficiency cause by monopoly. In this way they stop regulating the private companies and make their own monopolies. Although, economist prefer private monopolies to government owned monopolies. This is so because private ownership has an incentive to reduce cost if they are allowed to keep a part whereas in Government run monopoly usually bureaucracy and red tapism is found.

So, each of the policies have their own drawbacks so policymakers faces the trade-off between the monopoly's problem and its solutions.

Price Discrimination

In perfect competition there are many firm selling similar products, so when any firm try to charge price more than the market price, they will lose almost all the customers. In a monopoly market, there is only one firm selling a given product. When they raises it price it does not loses only some but not all its customers.

The monopolist usually tries to sell different units of output at different prices of a same commodity and this practice of monopolist is what is known as price discrimination. Price discrimination is not possible in competitive market because if any firm charge any price other than market price either they lose its entire customer to others or not be producing at efficient level. There are three types of price discrimination:-

First degree price discrimination: This happens when monopolist sell different unit of output to different people at different prices. Basically, a monopolist here charges each and every consumer price equal to their maximum willingness to pay or at their reservation prices. Thus in this type of price discrimination, consumer surplus is zero and producer surplus is equal to the total surplus. This is also known as perfect price discrimination. All the gains from trade have been exhausted and there is no deadweight loss to such a monopoly. The best example could be of a doctor charging different patients different fees depending on the financial condition of the patients who are assumed to be living in the neighbourhood and he is familiar with their financial condition. In figure 6, we are comparing monopoly with monopolist with perfectly price discrimination.

Second degree price discrimination: Here monopoly sell different units of output at different prices but every consumer receiving the same amount of good are paying the same price. In other words, price for the entire good purchased depends only on the amount of good purchased. Here monopolist provides customers different bundles of good at different prices and let consumer self-select their preferred bundle of goods. The example of second degree price discrimination can be different airfare for different class. Different services are offered to customer belonging to different class in the flights which help customer to self-select their class while travelling.

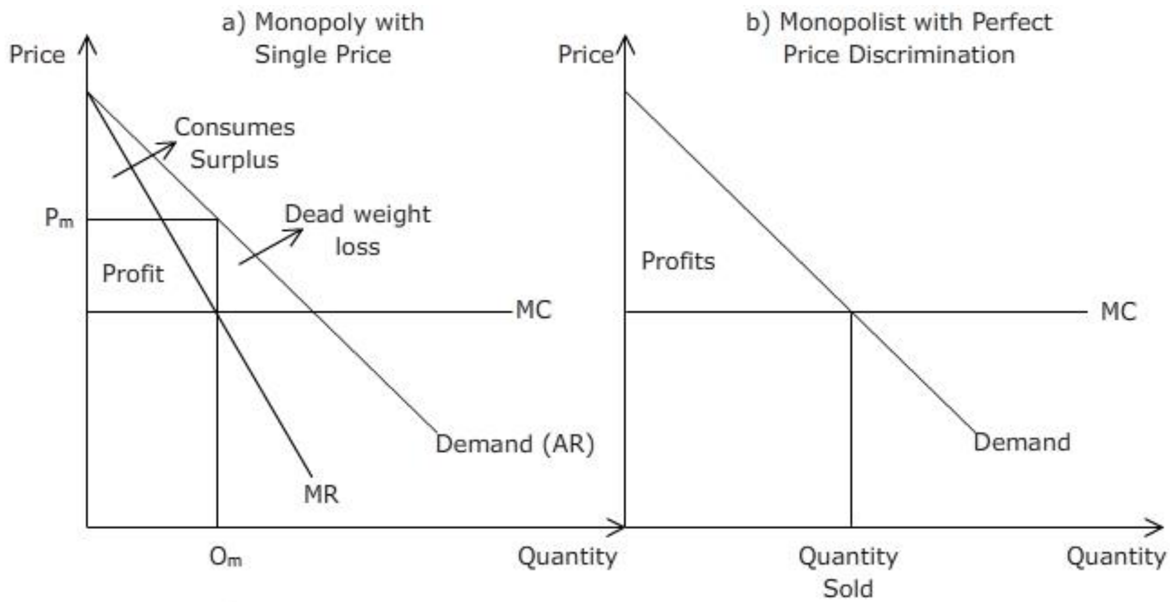

Fig. 5 : Comparing Monopoly with Monopolist with perfect price Discrimination

Third degree price discrimination: Here consumers get different unit of output at different prices but all those purchasing same amount of output have to pay the same price. Customers with different elasticity of demand are charged differently. Customer with low elasticity of demand is charged less whereas customer with high elasticity of demand is charged more. In this way a monopoly will maximize their profits. The best example of this might be discount to students on laptops.

Comparing Monopoly and Perfect Competition

	Perfect Competition	Monopoly
Number of firms	Many	One
Entry and Exit	Free	Restricted
Close Substitute	Many close substitutes	No close substitutes
Profit maximization condition	P=MR=MC	P>MR=MC
Economic profits	They earn no economic profit	they earn positive economic profits in the long run
Dead weight loss (Inefficiency)	No DWL occurs	DWL occurs
Price Discrimination	It's not possible in perfect competition	It's one of the behaviour of monopoly. So Possible.

Conclusion

In this chapter we discuss monopoly market. We learn that monopoly arises because of the barriers to entry. How market behaves differently in case of perfectly competitive market and monopoly market? We get the answer that profit maximization condition for the monopoly is where MR=MC and MC should cut MR from below. In Monopoly,
P> MR= MC. Why this is so? We also learn that monopoly produces an inefficient level of output and thus causes the deadweight loss. How policymakers can alleviate the problem of monopoly using antitrust laws, regulating and by public ownership? Through price discrimination monopolist can themselves eliminate DWL or at least reduce it.
The fact is that the real world exists between the two extreme, perfect competitions and the monopoly. Different degree of price discrimination is actually practiced in the real world.

Summary

1) Monopoly is a firm that is the only player in the market. It arises because of barriers to entry. Barriers to entry can be because of any of the following:
   a) Monopolies Created by Government
   b) Monopoly Resources
   C) Patents and copyright laws
   d) Natural Monopolies

2) Monopoly vs Perfect competition
   Perfect competitive firms are price taker whereas monopoly is the price maker. A competitive firm have a horizontal demand curve fixed at the price they charge and monopoly faces a downward sloping demand curve. P=MR in case of perfect competition and P>MR in case of monopoly which is the reason of inefficiency in the monopoly market. Profit maximization condition is although same in both types of firms. In case of monopoly if MR>MC, they will produce more and in case if MR<MC they will produce less.

3) Social cost of Monopoly
   Monopoly leads to deadweight loss by producing less than efficient scale of production. Deadweight loss is due to the fact that by charging price more than MR or MC they discourage those consumer who are willing to spend in between the price charged and MC. Total surplus get reduced.

4) Public Policies towards monopoly: Antitrust laws, Regulation and Public Ownership.

5) Monopoly Behaviour describing Price Discrimination: The art of selling different goods at different prices to the consumer is called price discrimination. There are three types of price discrimination. Examples of it are Movie tickets, Discount Coupons, Airfare pricing etc…

Questions for Review

1) How monopoly leads to deadweight loss?
2) What is the reason behind the inefficiency caused by a monopoly?
3) Why monopoly don't have supply curve? How does monopoly determine the output produced?
4) What are the different public policies to handle monopoly behaviour? Are they efficient?
5) Why do firm price discriminate? What are the types of price discrimination and give their examples?

Multiple Choice Questions

1) An industry with a single firm that produces output for which there are no close substitutes.

   a) Perfectly Competitive industry
   b) Pure Monopoly
   c) An imperfectly competitive industry
   d) Government Ownership

2) The shape of monopoly demand curve is

   a) Upward sloping
   b) Horizontal to the x-axis
   c) Vertical to the y-axis
   d) Downward sloping

3) Which of the following is true of a pure monopoly?

   a. A pure monopoly always charges the highest possible price.
   b. Producers in a pure monopoly enjoy complete freedom of entry and exit from the market.
   c. The pure monopoly's demand curve and the market demand curve are one and the same.
   d. The main concern of a pure monopoly is not profit maximization but preservation of its monopoly status.

4) The relationship between price and marginal revenue of a monopoly firm is

   a) Price = Marginal Revenue
   b) Price > Marginal Revenue

c) Price < Marginal Revenue
d) no relation exist

5) In which of the following industries consumer surplus is zero?

a) Second degree price discriminating
b) Pure monopoly
C) Perfectly Price discriminating industry
d) Imperfectly competitive market

6) In order to increase the amount of output sold, a monopoly must:

a) Increase the price of the last unit sold but maintain the price of all previous units sold constant.
b) Decrease the price of the last unit sold but maintains the price of all other units sold constant.
c) Decrease the price on all units sold.
d) Increase the price of all units sold.

Correct Answers/Options for the Multiple Choice Questions	
Question Number	Option
1	b
2	d
3	c
4	b
5	c
6	C

Justification for the Correct Answers for Multiple Choice Questions

Answer 1. Pure monopoly is a firm which is a single seller and has no close substitute for the good that they produce.

Answer 2. A monopoly has a downward sloping demand curve. As to increase the supply of a good they have to fall the price.

Answer 3. The pure monopoly's demand curve and the market demand curve are one and the same. As they are the only seller in the market, so there demand curve is same as market demand curve.

Answer 4. For a monopoly firm, price need to be more than marginal revenue. As selling an extra unit of quantity leads to raise in TR but by less than how much it got increased by selling the first unit. Monopolists have to reduce the prices for selling an extra unit that to not only on extra unit sold but also on all previously selling units which will result in the fall of TR.

Answer 5. Perfectly price discriminating monopoly charges every consumer price equal to their reservation price or their maximum willingness to pay which make their consumer's surplus equal to zero.

Answer 6. Monopolists have to reduce the prices for selling an extra unit that to not only on extra unit sold but also on all previously selling units which will result in the fall of TR.

Feedback for the Wrong Answers for Multiple Choice Questions

Answer 1. Option a) is incorrect, perfectly competitive industry have lots of firm selling homogenous goods and have lots of substitutes. Option c) is wrong as imperfectly competitive industry as they have more than one firm. Option d) is also incorrect as government ownership do have close substitute.

Answer 2. Option a), b) and c) are incorrect, as for monopoly to sell more they have to reduce price so its demand curve need to be downward sloping only. Thus cannot be upward sloping, horizontal or vertical.

Answer 3. Option a) is incorrect because the price a monopoly charges is constrained by the willingness of consumers to pay for the good it produces. Option b) is wrong as there is no entry or exit in purely monopolistic markets. Option d) is also incorrect because pure monopolies do not worry about potential entrants because entry is impossible.

Answer 4. There exist a definite relation between price and marginal revenue. So, option d) is incorrect. Price if, equal to marginal revenue, that means that more quantity can be sold without reducing the price which is not the case with monopoly. So option a) and option c) is also wrong.

Answer 5. Consumer surplus is zero in case of perfectly price discriminating monopoly as they charge price equal to their marginal willingness to pay. In all others cases CS is positive or negative.

Answer 6. Option a) is incorrect as the law of demand states that quantity demanded decreases as price increases. Option b) is incorrect as the price of all units of output sold must decrease. Option d) is also incorrect as the law of demand states that quantity demanded decreases as price increases.

Reference

1) Mankiw N.G. "Principle of Economics" 4th Ed, pg 240–267.
2) Varian Hal.R. "Intermediate Microeconomics" 7th Ed, pg 445–454.