

→ Chapter 03 :- Monopoly

Industrial Economics

Introduction:-

→ This chapter discusses various arguments made in favor of and in opposition to monopoly power. we will assume that the goods produced by the monopolist are given, and that their qualities are known by the consumers.

- ↳ Also monopolist charges the same price for unit of good for each good produced.
- ↳ No price discrimination.

Price above marginal cost without losing all its clients, such behavior leads to a price that is too high and to a "dead-weight" loss welfare loss for society

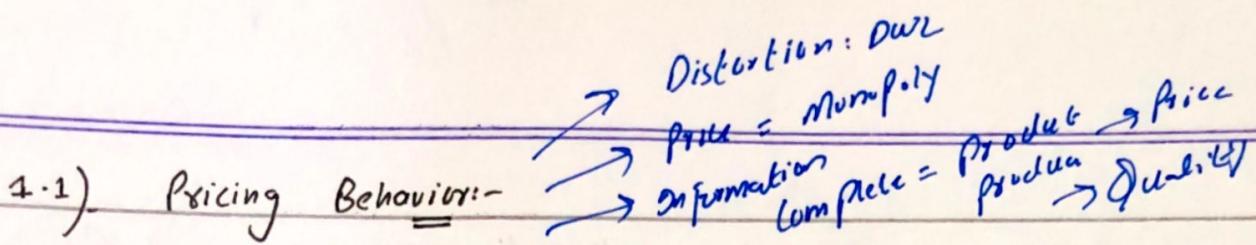
• Single product monopolist and a multiproduct monopolist with interrelated production costs of or interrelated demands for his various products.

• Inter-temporal pricing behavior of a durable good monopolist.

• More difficult for owners of a firm to keep control over its costs when the firm has monopoly power on product market.

• Thus a monopolist may produce given outputs at a higher cost than a competitive firm.

• Monopoly Power/Profit should not always be taken into account in the expression of welfare.



- The best-known monopoly distortion results from the monopolist's pricing behavior. Monopolist products are given and that their existence and quality are known to consumers.

1.1.1). A Single-Product Monopolist:-

→ 1.1.1.1). The Inverse Elasticity Rule:-

- Monopoly as a market situation where there is only one seller, facing no direct competition, and controlling a significant share of the market. This gives the monopolist the ability to set prices and quantities to maximize its own profits.

- Barriers to entry
- Market power & Pricing
- Price discrimination
- Inefficiency & welfare implications
- Regulation & antitrust policy

- The inverse elasticity rule, also known as the optimal markup rule, is an economic concept used to analyze the pricing behavior of firms with market power, such as monopolies or firms operating in imperfectly competitive markets. The rule states that the optimal price mark-up for a firm is inversely related to the elasticity of demand for its product.

- The inverse elasticity rule states that the optimal markup is equal to the negative of the inversely related to the elasticity of demand for its product.

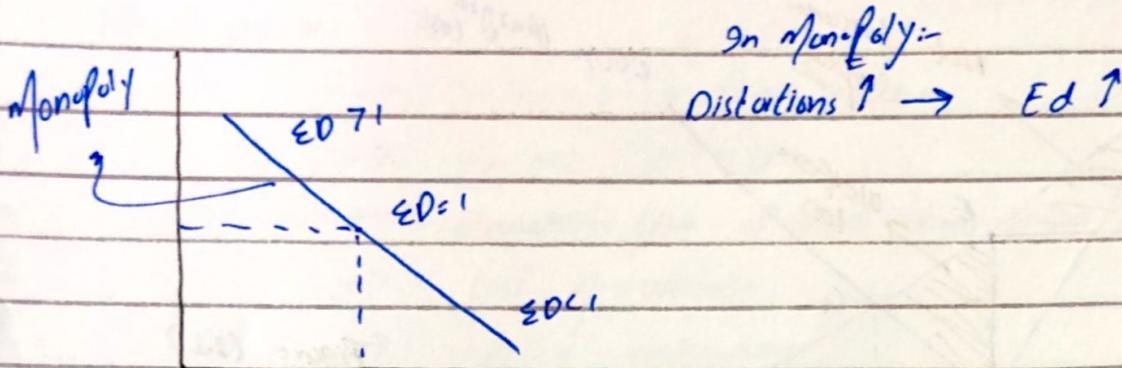
- Elasticity of demand
- Optimal markup
- Pricing & market power
- Policy implications

- Lerner index:- is inversely proportional to the demand elasticity. The monopoly sells at a price greater than the socially optimal price, which is its marginal cost.

- The price distortion is larger when consumers facing a price increase, reduce their demand only slightly.
- The intuition, of course, is that the monopolist is more wary of the perverse effect if a high price on consumption when consumers react to a price increase by greatly reducing their demand.

$$\text{Lerner index} = \frac{\text{Profit} + \text{Margin}}{\text{Price} - \text{MC}} \times \frac{1}{\epsilon_D}$$

• Monopoly price is a nondecreasing function of marginal cost.



In Monopoly:-

Distortions ↑ → Ed ↑

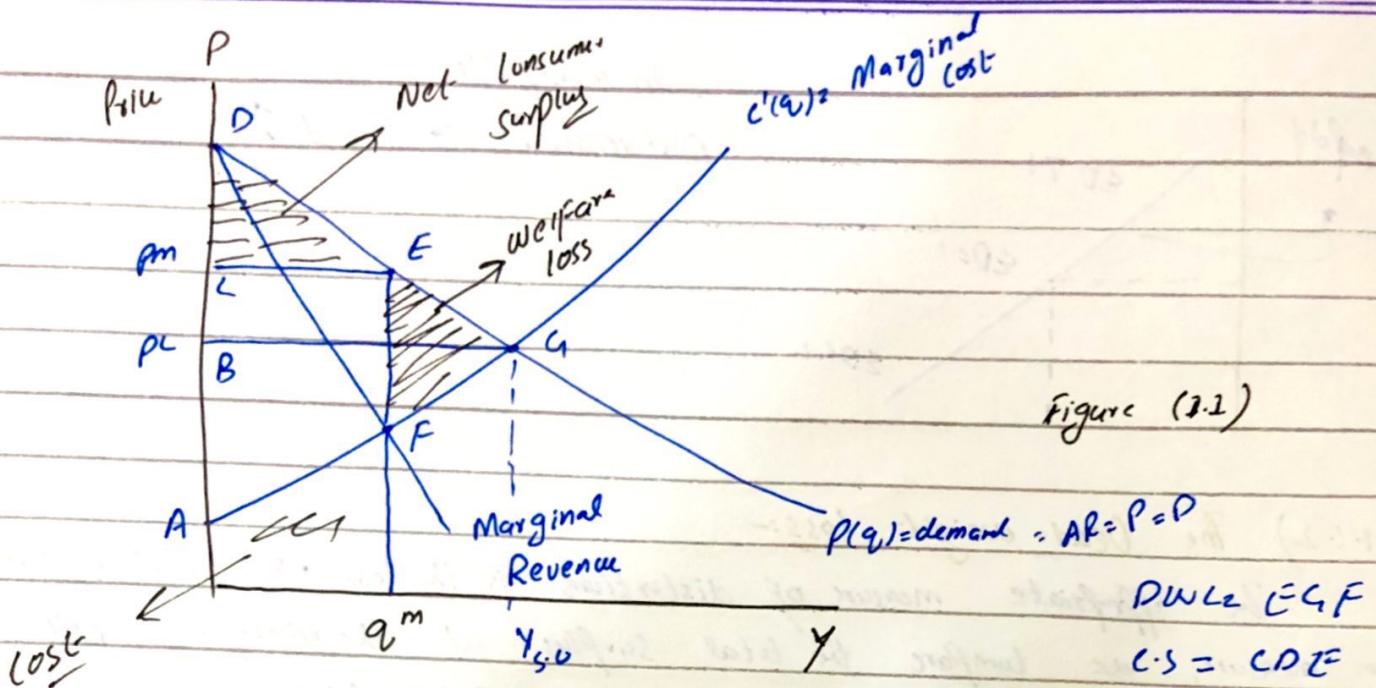
1.1.1.2) The Dead-weight loss:-

The appropriate measure of distortions is the loss of social welfare. To measure, we compare the total surplus at the monopoly price with that at the competitive (marginal cost) price.

- The total surplus is equal to the sum of consumer surplus and the producer surplus (or profit), or to the difference b/w total consumer utility and production costs.
- The net consumer surplus under monopoly is the area of "triangle" CDE in figure 1.1. The monopolist's profit is equal to the total revenue, $P_m q_m$ minus the integral of marginal cost - ACEF. Thus 'dead-weight' welfare loss is equal to the area of the "triangle" EFG.
- The welfare loss does not necessarily decrease with the elasticity of demand, even though the relative mark-up does.
- we cannot conclude that the welfare loss is monotonic in the elasticity of demand.

$$\text{Monopolistic Revenue} = P^m + T^m$$

$$\text{Monopolistic Surplus} = \text{Revenue} - \text{cost} = \text{CEFA}$$



- Lerner index:- also, known as the Lerner's measure of monopoly power, is an economic indicator used to quantify the degree of market held by a firm or industry.

$$\text{Lerner index} = \frac{P - MC}{P}$$

Ranges from 0 to 1, with high values indicating greater degree of market power & ability to set price above marginal cost.

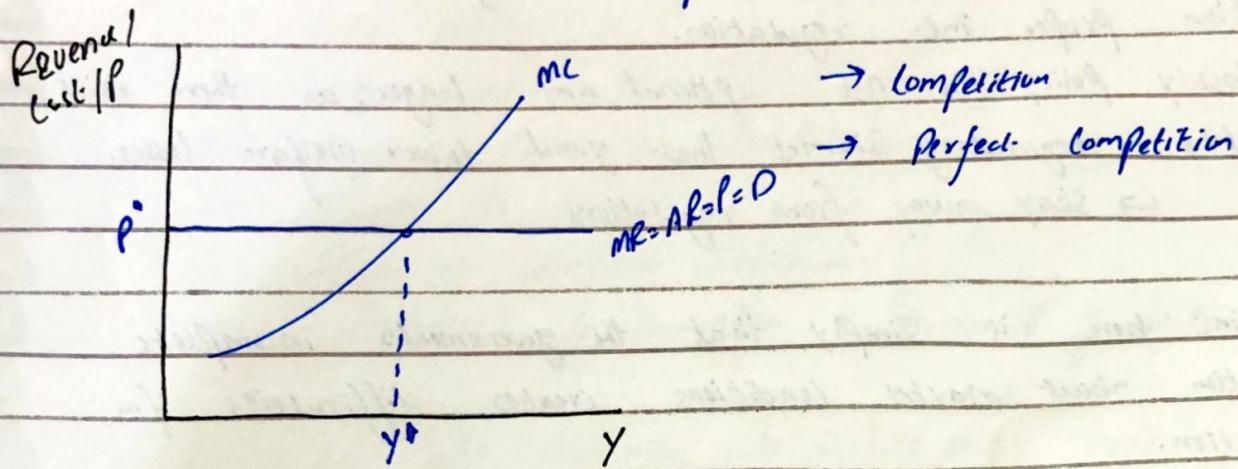
0 → suggests perfect competition

1 → increasing market power

- Dead weight loss:- Dead weight loss refers to the inefficiency and loss of economic welfare that occurs when the equilibrium quantity and price in market deviates from socially optimal level. It is the loss of potential consumer & producer surplus that arises due to market distortions, such as taxes, subsidies, price controls or monopolistic behavior.

Dead-weight loss

- Inefficient market outcome
- Market distortion
- Deviation from optimal equilibrium
- Loss of welfare
- Policy implications



11.1.3) The Effect of Commodity Taxation

- Consider one policy possibly prescriptive for resolving the social optimum in the presence of monopoly.
- But a pure transfer from consumers to share holders & has no reported social costs. Raise further problem
- It is difficult for government to estimate demand elasticity and to determine the marginal cost of the monopolist.
- But firms will seek to "inflate" the subsidy by its actions and its dealings with the government.
 - ↳ Govt. need information about demand & cost directly & not through monopoly.

- lost information is even harder, mon. poss. reluctant to release accurate estimates of its cost structure
- Alternatively, the govt can offer the monopolist incentives to reveal its cost structure.
- "Sophisticated" incentive schemes, we are moving from industrial organization proper inc. regulation.
- A subsidy policy is not optimal any longer, as there exist alternative regulatory schemes that yield lower welfare losses.
 - ↪ stay away from regulation
- The point here is simply that the government's incomplete information about market conditions creates difficulties for intervention.
 - ↪ informational asymmetries
- Shift in cost structure
- Increase in price & reduction in quantity
- Impact on consumer surplus
- Effect on producer surplus
- Dead weight loss

→ A Single Product Monopolists:-

In the case of a single product monopolist, the firm is the sole producer & seller of a particular goods or services, facing no direct competition in the market.

- Market power
- Price-setting
- Output determination
- Higher prices, lower output
- Barriers to entry
- Lack of allocative efficiency
- Potential for innovation & economies of scale

- The monopolist will maximize its profits by producing the quantity of output where marginal revenue equals marginal cost. Marginal revenue is the additional revenue that the firm receives from selling one more unit of output. Marginal cost is the additional cost that the firm incurs from producing one more unit of output.
- The monopolist's profits will be equal to the difference b/w the price it charges and its marginal cost.
- Profit of Monopolist will be affected
 - The demand elasticity
 - The monopolist's cost structure
 - The presence of govt regulation.

(1.1.2) Multiproduct Monopoly:-

Consider now the case of a multiproduct firm which has monopoly power over all the goods it manufactures. It produces goods $i = 1, \dots, n$ charges prices $P = (p_1, \dots, p_n)$, and sell quantities $q = (q_1, \dots, q_n)$ where $q_i = D_i(P)$ is the demand for good i . The cost of producing the output vector (q_1, \dots, q_n)

Multiproduct monopoly for which demands are independent. $q_i = D_i(p_i)$

(the demand for good i depends only on the price of good i) and total cost can be decomposed in n subcosts

$$(l(q_1, \dots, q_n)) = \sum_{i=1}^n c_i(q_i)$$

Monopolists imposes a higher markup on those goods with a lower elasticity of demand.

This results represents the simplest form of "Ramsey Pricing" which depicts how markups should vary with elasticities of demand.
→ multiple goods

Others:- A multiproduct monopoly is a market structure in which a single firm produces and sells multiple goods. This type of market structure is often found in industries where there are significant economies of scale or scope. For example, a firm that produces both cars & trucks may be able to produce these goods at a lower cost than two separate firms, each producing only one type of good.

demand curve & firm's Profit

- In a multiproduct monopoly, the firm faces a demand curve for each of its products. The demand curve for each product is downward sloping, meaning that firm can sell more of a good by lowering its price. However the firm's profit will also depend on how it prices its other products for example if firm sells two products that are complements (goods that are often used together), then the firm may be able to increase its profit by lowering the price of one product, even if it raises the price of other goods/product.

- Multiproduct monopolies can have a number of different effects on the market. They can lead to higher prices, lower output, and less innovation. However they can also lead to lower costs, increased efficiency, and more variety. The overall impact of a multiproduct monopoly will depend on a number of factors, including the specific market structure & behavior of the firm.

→ A multiproduct monopoly refers to a situation in which a single firm holds a monopoly position in the market for more than one product or service. In other words, the firm has exclusive control over the production and sale of multiple distinct goods or services.

- 1) Market Power
- 2) Cross Subsidization
- 3) Synergies & Economies of Scope
- 4) Anti-competitive Practices
- 5) Regulation & Policy Implications

1.1.2.1) Dependent Demands Separable Costs

First, consider case of goods that are substitutes. In this case, the Lerner index for each good i exceeds the inverse of the own elasticity of demand.

- ↪ An increase in price of good i exceeds the inverse raises the demand for good j . So if firm is decomposed into n divisions, each producing and marketing its own good and maximizing its own revenue ($R_i - C_i$), each division charges too low a price from the point of view of the aggregate firm. Hence, they must be given incentives to raise their own price.

↪ Second, for complements, the inverse of the own elasticity of demand exceeds the Lerner index for each good.

- A decrease in price of good i raises demand for good j . One or several of goods may be sold below marginal cost (i.e. Lerner index may be negative) so as to raise demand for other goods sufficiently.

1. **Dependent Demands:** Dependent demands refer to the relationship b/w the demand for one product & the demand for another related product. In some cases, the demand for a particular product depends on the demand for another product.
For example:- car manufacturers, require various components such as tire, engine, seats etc. to assemble a complete car. If demand for (a) \uparrow the demand for the component used in (a) production \uparrow will increase

2. Separable Costs: also known as avoidable costs, or direct costs, are costs that can be easily attributed to a specific product or segment of production. These costs vary directly with the level of output for that particular product or segment.

→ Separable costs are distinct from common costs, which are costs incurred jointly for multiple products and cannot be easily allocated to a specific product or segment. Examples of separable costs include the cost of direct materials, direct labor, and other costs directly associated with producing a specific product..

1.1.2.2) Independent Demands, Dependent costs

Assume that the demand for good i depends on its price only; $q_i = D_i(p_i)$. Designing a taxonomy for dependent costs is a bit more complex than designing one for dependent demands.

Indeed, although in the dependent-demand case one can easily envision a set of divisions, each in charge of one product, it may be rather unnatural to separate total costs into several components.

- Independent demand is the demand for a finished goods/product, such as a car, computer or pizza. The demand for independent demand items is not affected by demand for other items.
- A situation where the demand for one product is not directly influenced by the demand for another product.
- As a monopolist faces the market demand curve, it can set the price and quantity of product it produces. The demand for monopolist's product is independent of the demand for other products since there are no close substitutes available from competitors.
- 2 Dependent costs refer to costs that are influenced by the level of production or output. In the case of a monopoly, the monopolist incurs costs to produce & supply its product to the market. Costs may include, labor, raw materials, production facilities, & other inputs.

1.1.3) A Durable Good Monopolist:-

- In the case of a product that gives rise to goodwill the firm ought to take a dynamic perspective & sacrifice some current profits to enhance future profits.
- In contrast with the goodwill paradigm for non-durable goods, a customer who buys a durable good today is unlikely to buy the same good tomorrow. Thus the goods offered by monopolists at two different dates are substitutes rather than complements.
- A durable good monopolist creates his own competition. By selling today, he reduces demand tomorrow. To sell to the residual demand, the monopolist lowers the price tomorrow. But consumers ought to expect a price decrease & hold back on their purchases today. These rational expectations hurt the monopolists.
- Valuations " $v=1,2,\dots,7$ ". Monopolist monopoly price = 4 & sells to consumer with valuation $v \in \{v\}$. Non multi-period model. Suppose monopolist charges 4 in period 1, and that consumers with valuations exceeding 4 accept. At beginning of period 2, the monopolist is left with a residual demand, composed of consumers with valuations 2 through 3. The monopolist is then tempted to charge a lower second period price.
↳ Monopoly price corresponding to residual demand.

When consumers realize in period 3, that monopolists will have ex post, an incentive to lower the price in period 2. Consumers with high valuation may still accept paying 4 because they are eager to get the good. However, the consumer with valuation 4 for instance does not buy because he would get zero surplus whereas by waiting he could get a positive Surplus. Thus, the expectations of future price cuts reduce the demand in period 1.

→ The equilibrium takes the form of a decreasing price sequence. Thus, the monopolist price - discriminates over time; He first charges a high price and sells only to consumers who are most eager to buy the good. He then cuts his price to reach a slightly less eager clientele & so on.

↳ books example

→ The flexibility that monopolist has to adjust his price over time actually hurts him.

↳ when price adjustments become more & more frequent the monopolist's profit converges to zero.

Others:- A durable good monopolist refers to a situation where a single firm holds a monopoly position in the market for a durable good. A durable good is a product that has an extended lifespan and can be used over a relatively long period of time, such as cars, appliances, furniture or electronic devices.

- ↳ 1) Market Power
- 2) Pricing Strategies
- 3) Consumer Behavior
- 4) Innovation & Product Differentiation

* Coase theorem suggests that, under certain conditions, private parties can negotiate and arrive at efficient outcomes in the presence of externalities, even in the absence of government intervention. → Property rights & transac. cost example.

↳ Externalities can be resolved through private bargaining between the parties involved.

1.1.4) Learning the Demand Curve:-

- We assume that monopolist know his demand curve perfectly.
↳ Monopolist conducts market surveys. → But such surveys are costly & imperfect, and they always leave some residue of uncertainty about the demand curve.
- A complementary way of learning demand is to experiment by changing prices over time, which usually allows a better estimation of the demand curve than keeping one's price constant.
- Intertemporal Pricing by a monopolist in a Bayesian setting.
One thing is certain when setting his price at a given date, the monopolist should not maximize expected current profit given his current (posterior) beliefs about the demand curve. Rather, he should also take into account the value of information thus obtained for future pricing.
- The monopolist eventually learn his demand curve and therefore charges the full information monopoly price in the long-run.
- Non concavities or discontinuities in profit function may prevent the monopolist from learning his true monopoly price even if the demand curve is deterministic.

The demand curve for a monopoly is important because it helps the monopolist to determine the profit-maximizing price & output. The monopolist will ~~ever~~ choose to produce the quantity at which $MR = MC$. The price at which this quantity can be sold is found from the demand curve.

Unlike in a competitive market, where the demand curve is typically downward sloping, the demand curve for a monopolist's product is the market demand curve, and it represents the entire demand for the product in the market.

- 1) Market Power
- 2) Market Demand
- 3) Elasticity of Demand
- 4) Pricing strategies
- 5) Consumer Surplus

1.1.5) Inventories:-

- Assumed that in each period, sales originate from current production.
In practice, inventories may allow firms to separate production from sales.
 - A sizable & interesting literature treats the dynamics of quantity & price adjustments, when a firm faces shocks and can smooth its price path and its production path through inventory holding
→ Transitory single period upward shock
 - In absence of inventories, the price & output adjust upward. They still do in the presence of inventories but to a lesser extent. The firm can reduce its inventory temporarily and replenish it later.
- Asymmetric price response to upward & downward shocks.
- Monopolist can sell only from existing inventories.
 - Lag b/w the use of inputs & the availability of output

Inventories play a significant role in understanding the dynamics of a monopolistic firm's production, pricing & supply decisions.

1. Inventory Management
2. Price Discrimination
3. Buffer against Uncertainty
4. Production Smoothing
5. Strategic Behavior

- The cost of production
- The demand for the good
- The lead time for production
- The costs of holding inventory

2.2) Cost Distortions:

Monopoly power can also have perverse effects on the supply side. In particular for given goods produced by the monopolist and given quantities of those goods to be supplied to the consumers, a monopolist may produce at a higher cost than would a competitive firm.

→ These costs of production deviates from what they would be under competitive conditions.

- ↳ Higher prices ↳ Deadweight loss
- ↳ Lower production Efficiency ↳ Rent-Seeking Behavior
- ↳ Lack of innovation.

- 1.1) how mon. poly pricing lowers consumer surplus and raises profit surplus from relative to a competitive behavior
- 1.2) how for a given output, a mon. p. may inflate position costs. → DWL

1.3) Rent Seeking Behavior

Third distortion associated with monpoly: the wasteful expenses incurred to secure or maintain a monopoly position