

## Monopoly

Monopoly is a market structure in which one firm makes up the entire supply side of the market. That is, it is the polar opposite to Perfect Competition we discussed earlier.

### How do they come about?

They usually come about due to inability of entry by new firms. These barriers could be

1. Legal Barriers: Such as when the firm which manufactures the product holds a patent.
2. Natural Barriers: An example of this occurs when the market is sufficiently small such that a new firm cannot profitably operate. We call such a monopoly a **Natural Monopoly**.

### Key differences between a Monopoly and Perfect Competition

Monopoly	Perfect Competition
Single Firm	Large Number of Firms
Barriers to Entry	Free Entry and Exit
Price Setter	Price Taker

### Let's examine the consequence of these differences each in turn:

1. The reason why the market structure has a single firm is because of **barriers to entry** which under Perfect Competition does not exist.
2. Since all firms can freely enter and exit, the market consists of a large number of firms where none has any market power, and face a horizontal demand. The Monopoly however on account of its market power since it is the sole supplier faces the usual downward demand. **It can only increase quantity supplied by lowering its price.** That is the Monopoly is a Price Setter, as opposed to Price Taker.
3. In the Perfect Competition all firms act in their own self interest through competition, and consumers benefit from this since they get the maximum quantity of a good at the lowest possible price. However, a Monopoly due to its market power due to a lack of competition as we will see can in fact have positive profits in both long and short run, and it is often to the detriment of consumers.

### How does a Monopolist make its Profit Maximizing Choice?

#### 1. Determination of Profit Maximizing Quantity using the condition $MR=MC$

Recall that the Profit Equation for a firm is just

$$\pi = PQ - C(Q) \equiv P(Q)Q - C(Q)$$

Note that whereas previously for a Perfectly Competitive firm, we have a horizontal line at price  $P$ , since the perfectly competitive firm is a price taker, a Monopolist has downward sloping demand, which I have written here as price  $P$  that is dependent on quantity supplied,  $P \equiv P(Q)$ . So just like any profit maximizing firm, a monopolist chooses the profit maximizing quantity supplied by equating its marginal revenue to its marginal cost. That is:

$$\begin{aligned}\max_Q \pi &= \max_Q P(Q)Q - C(Q) \\ \Rightarrow \left( \frac{dP(Q)}{dQ} Q + P(Q) \right) &= \frac{dC(Q)}{dQ} \\ \Rightarrow MR &= MC\end{aligned}$$

The right hand side of the condition tells us that the monopolist has to consider the fact the demand for its good is downward sloping, i.e. it can increase quantity sold by reducing prices.

Note from the condition that

$$\frac{dP(Q)}{dQ} Q + P(Q) < P(Q)$$

Where  $\frac{dP(Q)}{dQ}$  is just the slope of the demand schedule of the monopolist. Since

we know that the slope of the demand is negative, this means the **marginal revenue curve is always below the demand**. Matter of fact, assuming the linear demand that we have been using, there is a strict relationship. Let us assume a general demand  $P = a - bQ$  where both “ $a$ ” and “ $b$ ” are positive numbers. Then total revenue is just

$$TR = P \times Q = (a - bQ) \times Q = aQ - bQ^2$$

and the marginal revenue is

$$MR = a - 2bQ$$

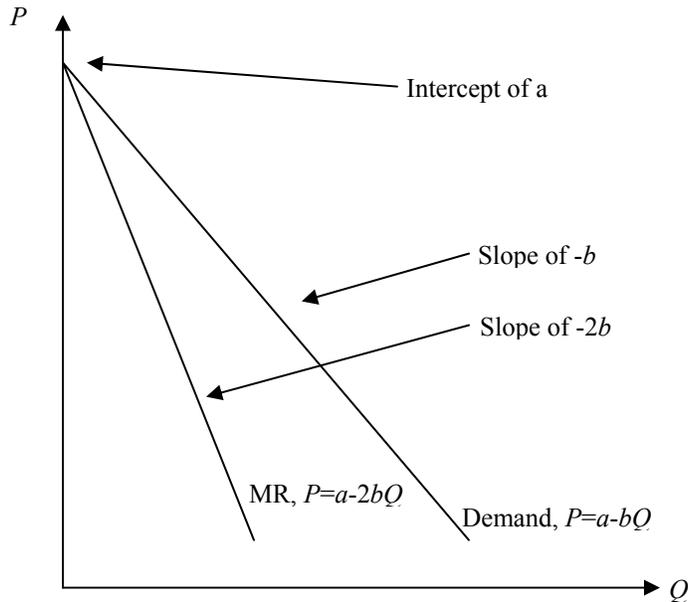
Now compare the marginal revenue equation  $MR$  and the demand equation

$$P = a - bQ$$

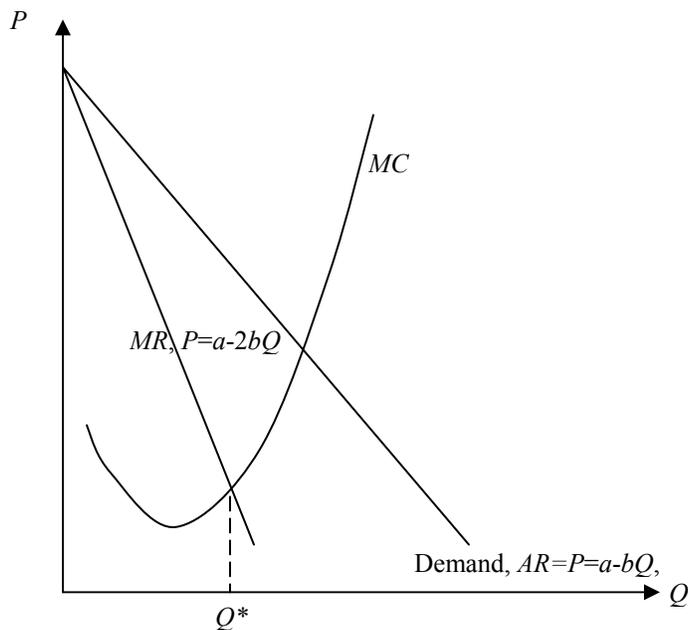
What do you notice? There should be two things:

1. They both have the **same intercept**.
2. The **slope of the marginal revenue is steeper**, and is **twice that of the demand curve**.

Diagrammatically, we can then draw the two as



Then the monopolist determines its profit maximizing quantity by equating its  $MR$  to its  $MC$ . Diagrammatically,

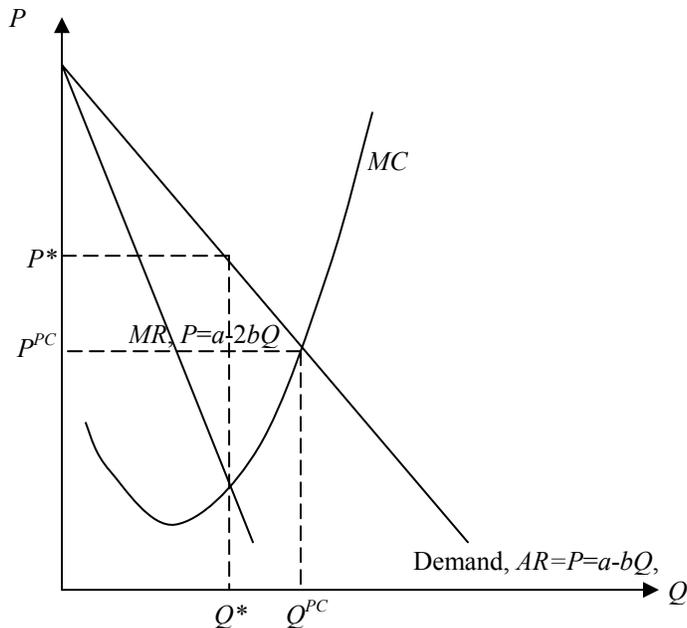


## 2. Price Determination Using Demand Equation or Schedule

Now that we know how monopolist determine the profit maximizing quantity, how about the prices? Easy! Use the demand. But why? Why is it not determined by the  $MR$  schedule? Ask yourself this, if you were to use the  $MR$  schedule, is the price you charge greater or less than if you were to use the demand. Further,

## ECON 100:11 Monopoly

conceptually, what consumers are willing to pay are reflected by the demand, not the marginal revenue schedule. Further, the monopolist's supply or its  $MC$  is the industry's supply, while for a perfectly competitive industry the supply is the horizontal summation of all the supply or  $MC$  curves. Diagrammatically,

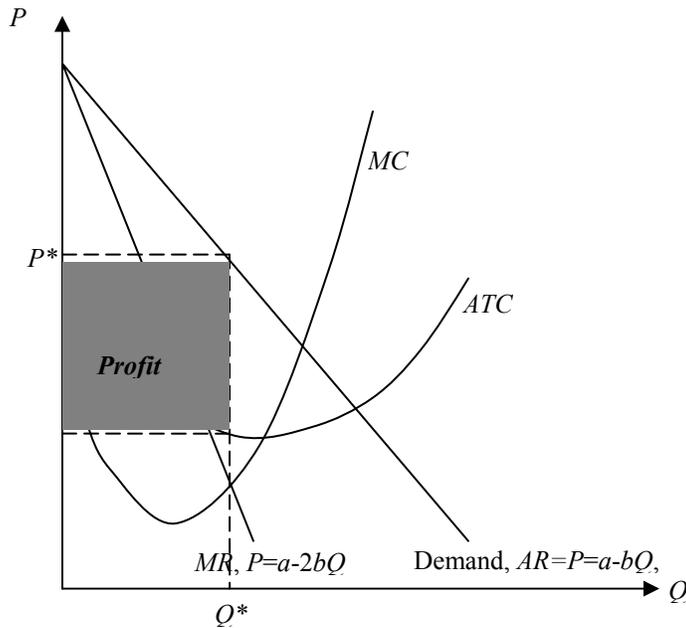


So what is the significance? Have a close look, and recall that a firm under perfect competition chooses price and quantity such that  $P=MC$ . The price noted about is  $P^{PC}$ , and it is lower than  $P^*$ . That is a monopolist charges a higher price and supplies a lower level of output.

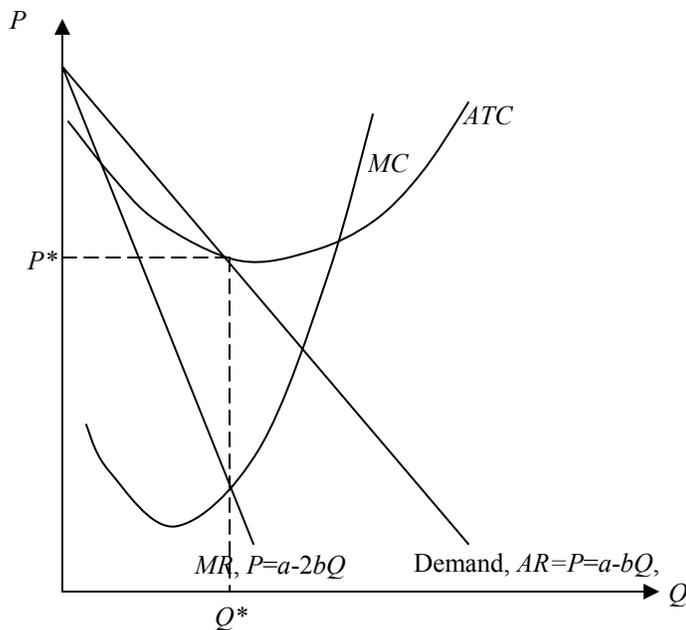
How is it they can do that? Simple, although like the perfectly competitive firm, its equilibrium choice is determined by  $MR=MC$ . But unlike the competitive firm, its  $MR$  is not equal to its price. In fact from the above discussion, we have proved that the  $MR$  is always below the demand, and consequently prices due to the fact it has market power.

**How about a Monopolist's Profits?**

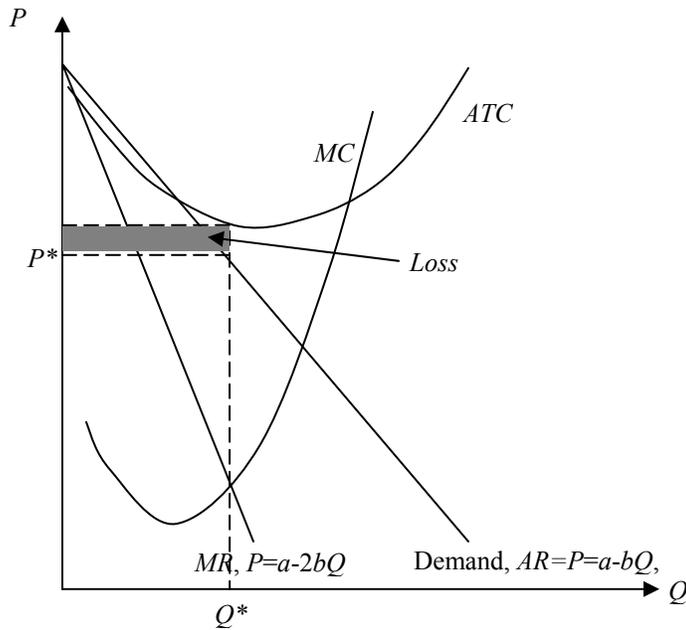
As noted at the beginning, monopolist on account of its market power has positive profits, as long as there is demand for their products, and when its cost is sufficiently low. Diagrammatically,



When does a monopolist earn zero profits? This occurs when the  $ATC$  is just tangent to or intersects the demand at the profit maximizing choice of quantity supplied. Diagrammatically,

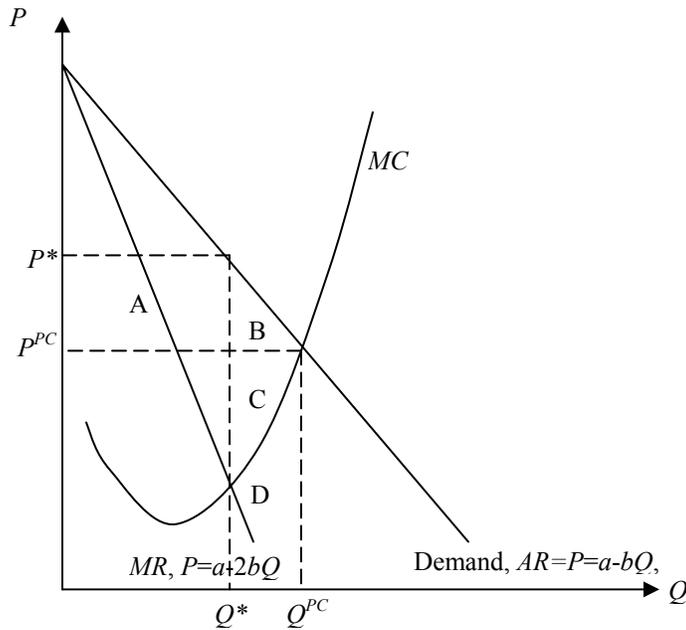


How about when it makes a loss?



**Why do we think that monopolies are bad for consumers? Why do we have competition bureaus that protect consumers?**

To answer this question, we have to revert to the use of consumer surplus. And to understand the fuss, we have to compare the outcome with perfect competition. Let's examine this using the diagram we have been using,



From the above diagram, there are several points to note:

## ECON 100:11 Monopoly

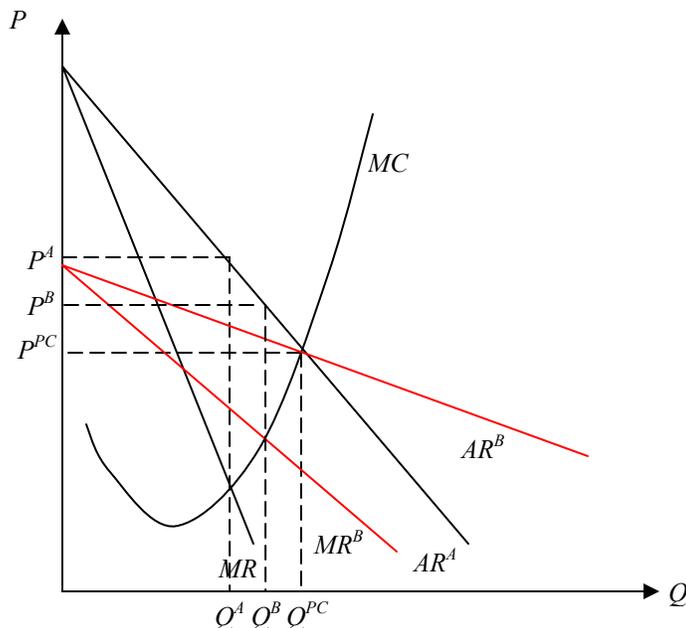
1. Because of market power, the monopolist captures the portion of consumer surplus,  $A$ , that would have accrued to consumers under perfect competition.
2. Because of the fact that a monopolist's  $MR$  is less than price, they chooses to produce less than the competitive level, and hence creates deadweight loss,  $B+C$ . This is commonly noted as welfare loss, since society would have benefited from this had production been increased to the competitive level.
3. Because of their choice, resources that could have been used to produce more goods are diverted to other uses in the form of  $D$ . This is not a loss to the society in general, unless the resources diverted are used for evil, and goods produced by the monopolist potentially benefits human kind!

Therefore for primarily these reasons monopolies, unless natural monopolies, are generally frowned upon. An example of a monopoly that has been forced to break up into smaller firms that compete with each other is AT&T.

### What other concerns do we have with regards to Monopolies?

Consider this: what if the firm knows your demand for their product, and chooses to charge you a different price on account of the fact that your willingness to pay is different from the next person. This is in general known as **Price Discrimination**, and it refers to the practice of **charging different prices to different individuals or groups of individuals**.

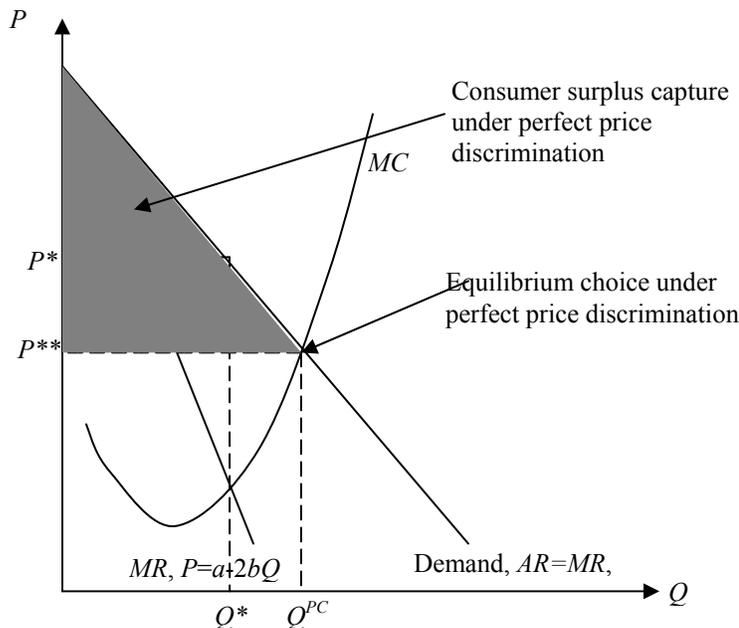
How could this be done? Well, since it has monopoly power, and if through some market research program finds out the features of different segments of the market. The monopoly could segment its market into consumers with high elasticity of demand and low elasticity of demand and offer different prices for different quantities. Let there be two types of consumers, *A* and *B*, where type *A* consumers have inelastic demand, and *B* has more elastic demand. Diagrammatically,



So the monopolist in effect consumers with the more inelastic demand, type A a higher price, and type B consumers a lower price. Notice that under perfect competition, both consumers would have purchased the same quantity at the same price.

Actually, it can get worse (note that this sort of practice can be performed under market structures besides a monopoly which we will cover later). Consider this: What if the firm knows every ones demand, and can perfectly price discriminate, by having you pay for the good according to what you are willing to pay for. Imagine, this would mean the monopoly captures all of the consumers' surplus. How is that possible, since *MR* must equate with *MC*. Ask yourself this: what is the *MR* when a monopolist can perfectly price discriminate? It actually means now that the *MR* and Demand are the same, since what it get for every additional unit of quantity supplied is the consumer's willingness to pay for

the product. They will do so up to the point where the demand equates with  $MC$  now. Diagrammatically,



Although this does not benefit consumers, when viewed from society as a hold including firms, society gains from the increased production to that that would have been chosen by a perfectly competitive industry, and we do not have any deadweight loss or welfare less anymore!

How can Price Discrimination be Sustained?

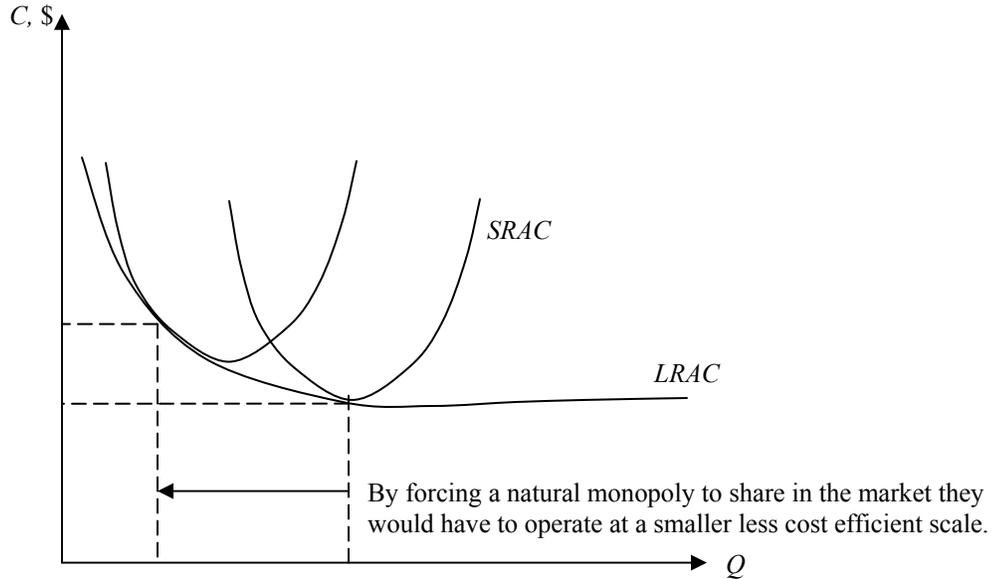
1. The Firm must have **Market Power**.
2. Consumers must have **different elasticity of demand**.
3. **No Arbitrage**: That is an individual who bought the good at a lower price cannot circumvent the market process and sell it to others at a cheaper price than what the others would have been willing to pay, and yet still make a profit.

**Why are there Monopolies?**

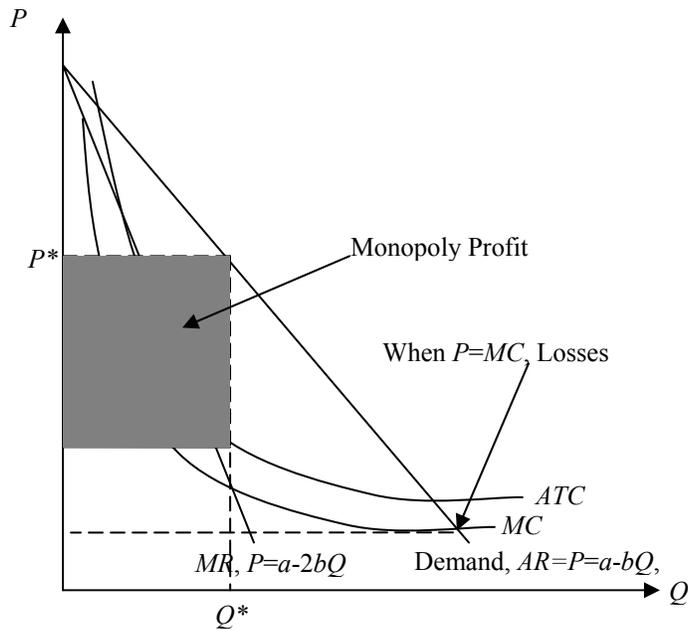
Let's reexamine the question of where monopolies firm, or can sustain itself without competition. How is it possible that although a single firm is earning positive profits, that no one else what to get a piece of the pie? Here are some reasons for the existence of barriers to entry:

1. Economies of Scale: When production is characterized by increasing returns to scale such that the larger the firm becomes, the more cost effective it becomes for it to produce output. This then mean that smaller firms cannot produce their output cheaply to compete with larger firms, and so do not enter. At the extreme, we would get natural monopolies, and it refers to an industry where a single firm can produce at a lower cost than can two or more firms. Under this circumstances, it is not feasible for the government to intervene, and force firms to lower levels

of production, thereby producing at a higher cost, since this would translate into higher prices as well. Examples of these are public utilities. Diagrammatically,



Also it will not always make sense to force the monopolist to produce at the competitive level when there is a natural monopoly. Consider such a possibility:



2. Setup Costs: This occurs when a new entrant would require large investments in capital to start operation, which may significantly deter entry.
3. Legislation: This could come in the form of government legislating that the firms in a particular industry be operated as a monopoly, or when the government grants

a patent which protects inventors of new innovations from having their designs or products copied.

4. Other Reasons:
  - a. A monopoly may either legally or “illegally” possess factors of production or prevent others from obtaining these factors of production thereby inhibiting entry.
  - b. Learning-By-Doing: A firm may also improve its processes just because it is the incumbent firm, thereby becoming very efficient at what they do, such that a new entrant may not be able to duplicate or match effectively.
  - c. Anti-competitive Behavior: Example, Threats of Price War on entrant entering. What do we need for such a threat to be credible?