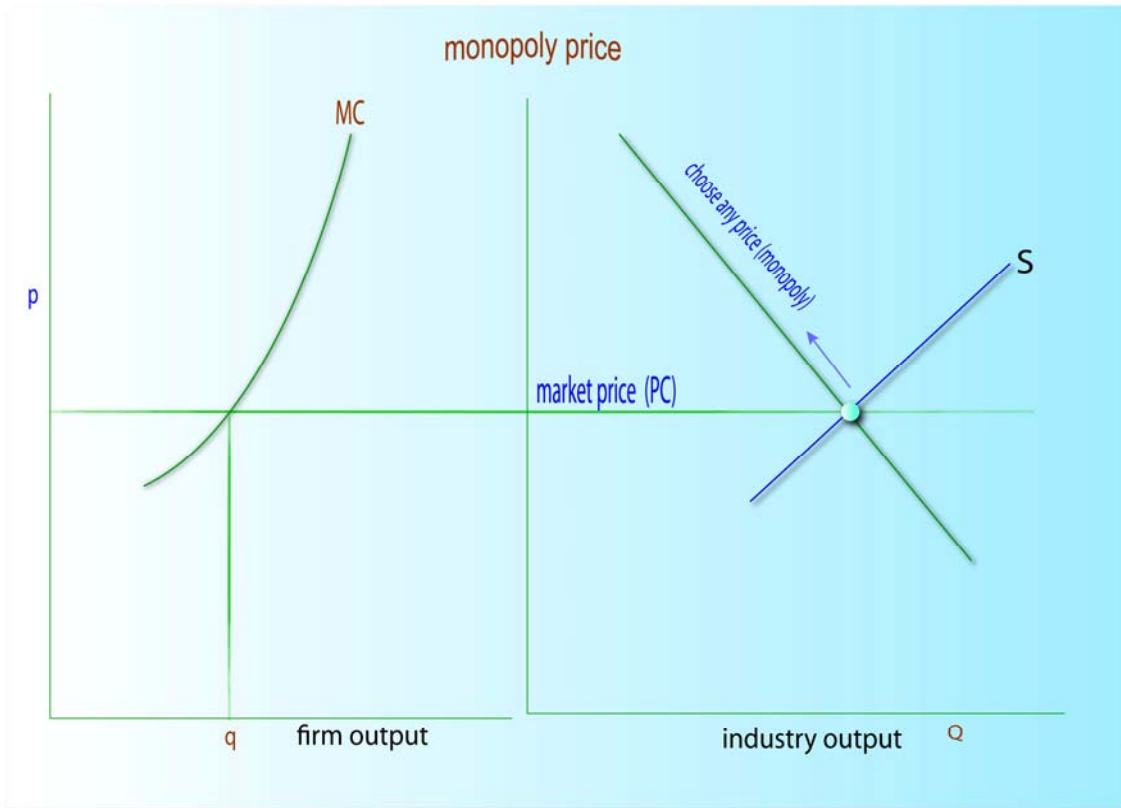


Chapter 11. Monopoly,  
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<p>Why do we say a monopolist is a price setter?</p>	<p>Monopoly and Market Demand</p> <p>Unlike competitive firms, which only adjust outputs, a monopolist can set price anywhere on the market demand curve. But the purpose is to maximize profits.</p> <p>Monopoly price will be higher than the price competitive firms get.</p>
<p>Thus, monopoly price will be above the intersection of Demand and Supply schedules.</p>	<p>Si!</p>
<p>Why not charge the highest price?</p>	<p>The highest price will be where the market demand curve intersects the vertical axis. There would be no highest price if the demand curve does not intersect but approaches the vertical axis asymptotically. [the distance between demand curve and the vertical asymptote/line tends to zero as price increases]</p> <p>However, charging high price is NOT the objective. Profit maximization is the goal.</p>

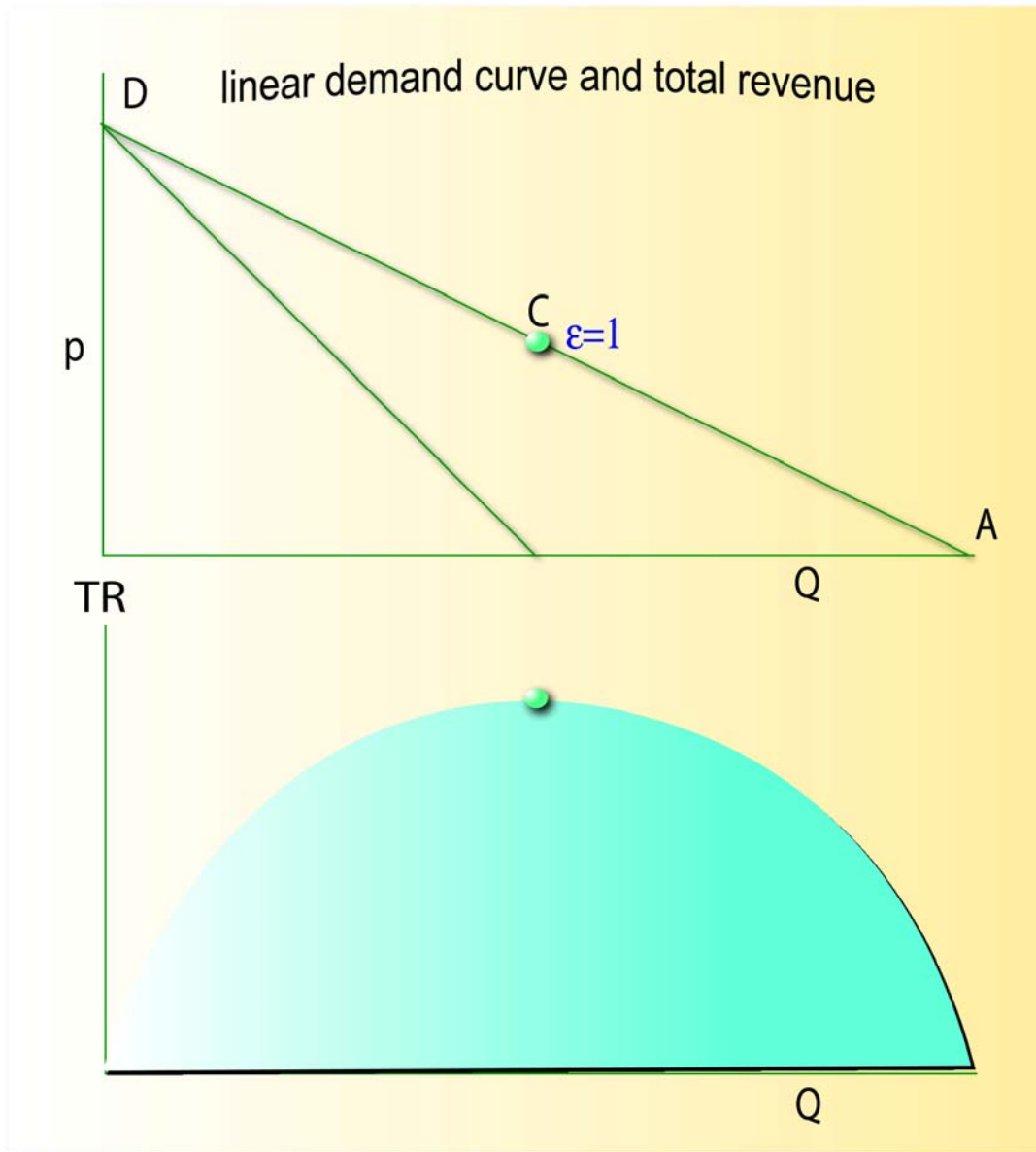
Figure 2 (Perfect competition vs Monopoly)



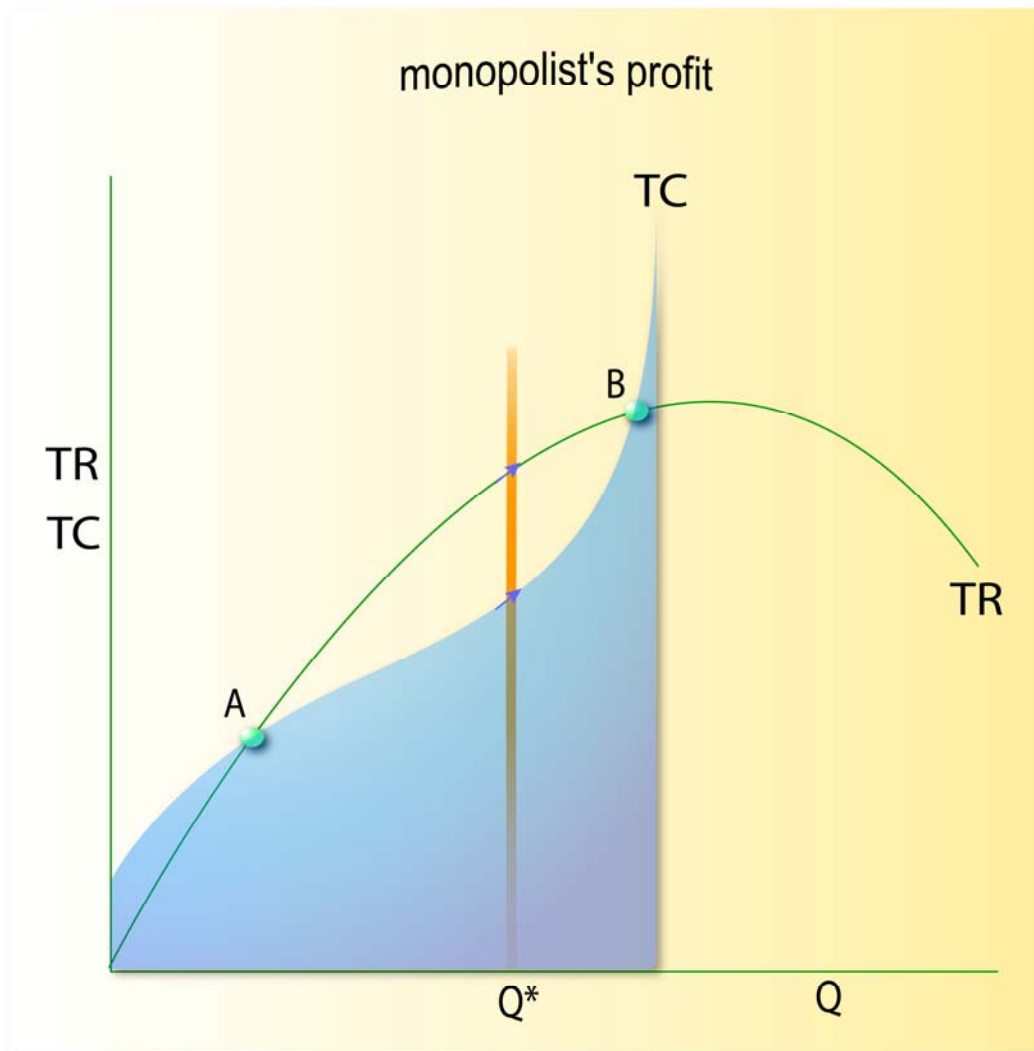
	Let us consider the relationship between Demand and MR.
<p>● Why does MR always lie below market demand curve?</p>	<p>That is because demand curve is Average Revenue curve.</p> <p>Market demand curve shows the price (per unit) consumers are willing to pay for a given quantity.</p>
<p>Let me see —</p> <p>Total Revenue = <math>p(Q)Q</math>.</p> <p>Demand = Average Revenue = <math>\frac{p(Q)Q}{Q} = p(Q)</math>.</p>	<p>By the Law of Demand, AR curve is downsloping as output increases.</p>
<p>AR is decreasing because MR is less than AR.</p>	<p>Moreover,</p>

$MR < AR = p(Q).$	$\hat{R} = \hat{P} + \hat{Q} = \hat{P}(1 - \epsilon),$ where $\epsilon \equiv - (\Delta Q / \Delta P)(P / Q) =$ price elasticity of demand.
Can we consider a concrete example? Say, the case of a linear demand curve?	Sure.

Linear Demand and TR:



	<p>SR PROFIT MAXIMIZATION</p> <p>The monopolist's problem is choose Q to maximize</p> $\pi = R(Q) - C(Q),$ <p>where <math>R(Q) = p(Q)Q</math> is revenue.</p> <p>Do you notice any difference between the problems of a monopolist and a competitive firm?</p>
<p>Well... Market price is NOT fixed. The monopolist chooses price.</p>	<p>Right.</p> <p>Accordingly, TR curve is NOT a ray from the origin, but a curve as shown below.</p>



So, the monopolist choose the rate of output where the vertical distance,  $p(Q)Q - c(Q)$ , is maximized.

The FOC is:

$$\pi' = R' - C' = 0,$$

i.e., marginal revenue equals marginal cost. Differentiating (1) further with respect to  $Q$  gives the SOC,

$$\pi'' = R'' - C'' < 0,$$

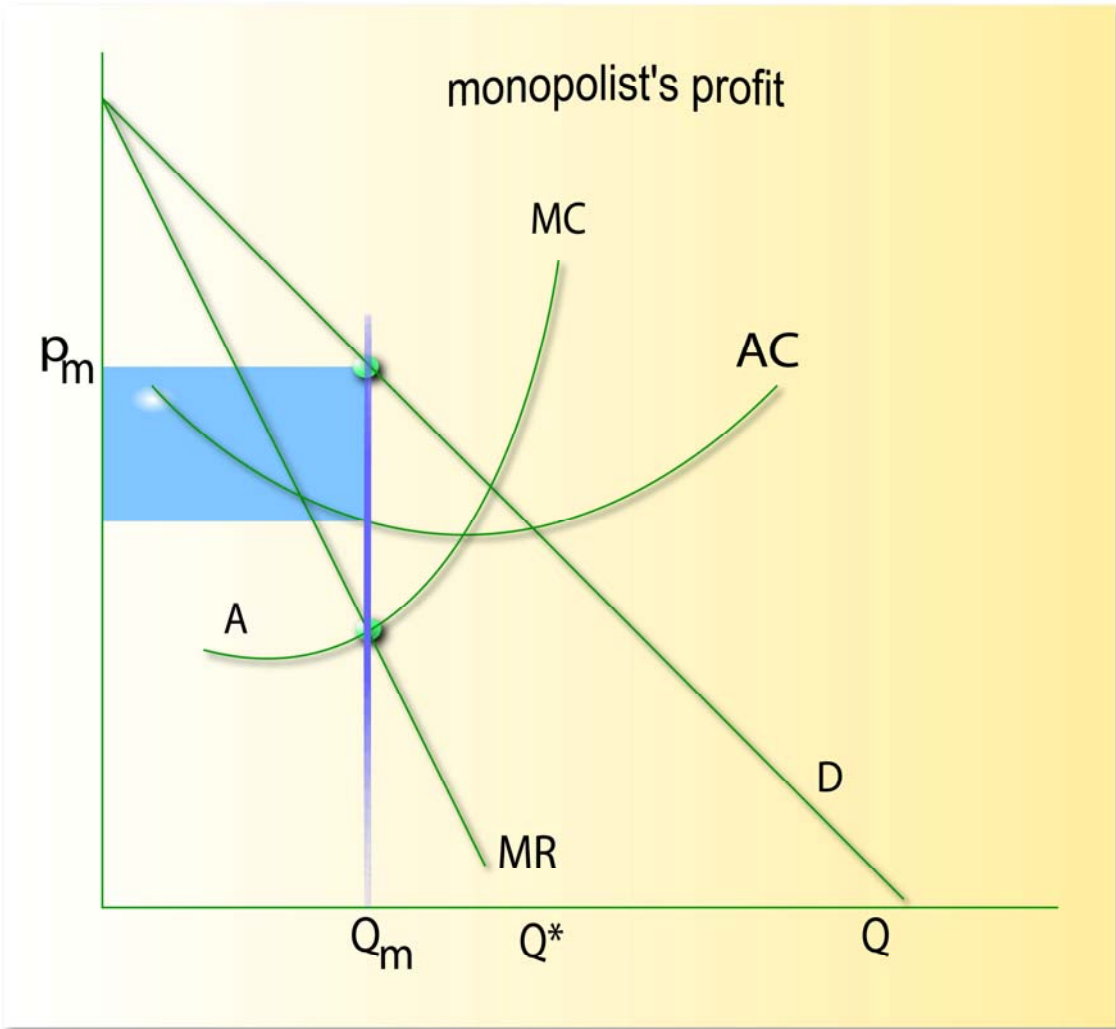
Excellent!




The FOC simply says TR and TC must have the same slopes.

In the above diagram, there are two places where this is true. The second order condition shows that MC cuts MR curve from below.

Can you now summarize the SR production decision rule?

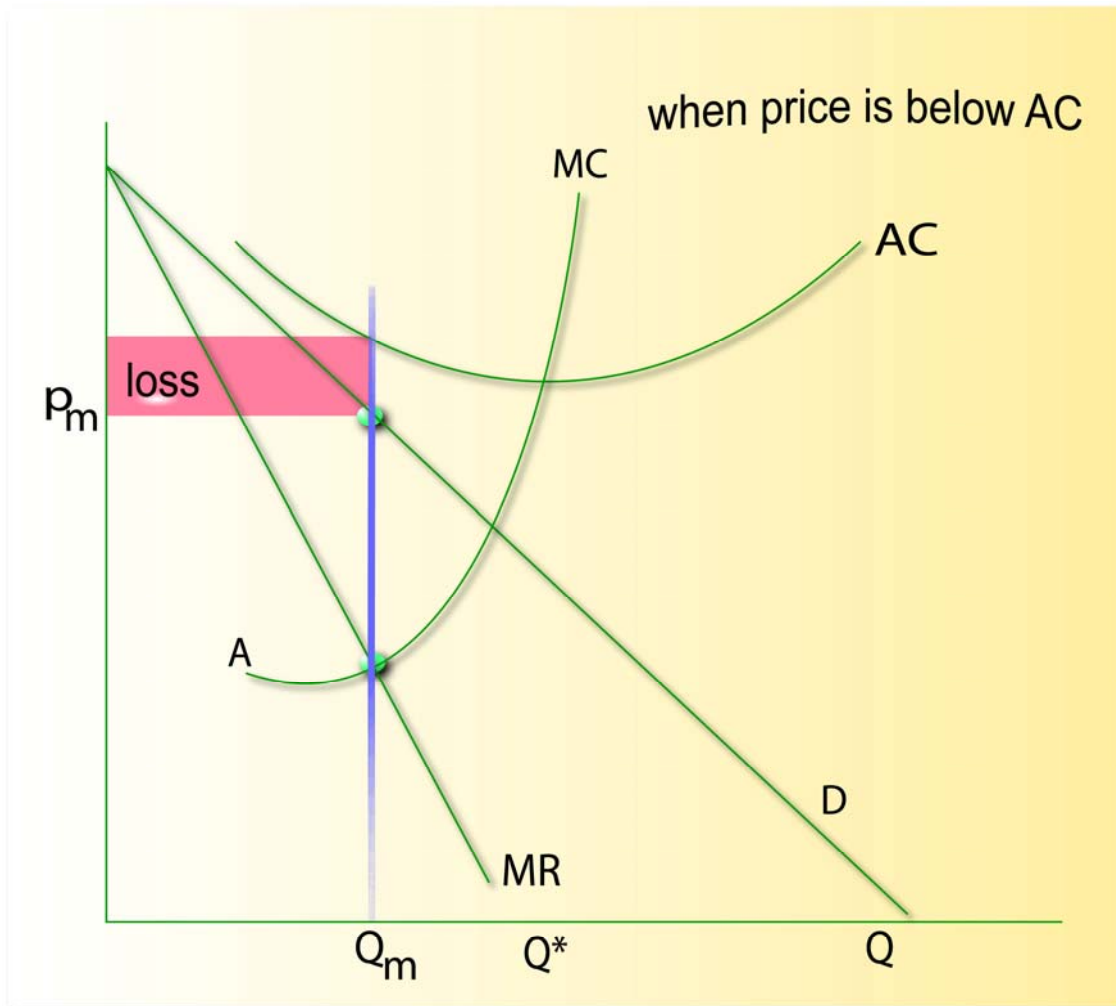
which literally means the slope of MR curve – slope of MC curve must be negative.	
Didn't I just derive both the FOC and SOC?	Those are not enough!
What then is missing?	How does one know if the monopolist is earning profits?
Now the monopolist has to know whether he can earn profits or at least recover costs.	Remember that in the SR the monopolist has to recover the variable cost.
<p>I got it.</p> <p><b>SR production decision</b></p> <p>If <math>p \geq \min AVC</math>, then choose <math>q</math> such that</p> <p style="padding-left: 40px;"><math>MR = MC</math> (First Order Condition)</p> <p style="padding-left: 40px;"><math>MC</math> cuts <math>MR</math> from below (Second order condition),</p> <p>Then set <math>p = p(Q)</math>.</p>	Very good!



<p> Since a monopolist is the only firm selling the product, he must always be enjoying positive profits.</p>	<p>If that were true, all inventors will be rich. There are 1.5 million patents in effect in the US, but only 3000 are commercially viable. That is, 99.8% of inventions are failure (US patent and Trademark office.)</p> <p> Only 1 in 500 inventions make money.</p>
<p>Does that mean inventions are not good ideas?</p>	<p>An invention or a new product might be a good idea, but if there is not enough demand for it, the product is not commercially viable.</p>
<p>Then it all depends on the relationship between price and average cost.</p> <p><math>\pi = Q(p - AC)</math>.</p> <p>If price is less than average cost, then the monopolist incurs a loss.</p>	<p>Right.</p> <p>Many brilliant painters and composers do not earn enough during their lifetimes, but their products might be appreciated by later generations.</p>
<p>Invention is a very risky business.</p>	<p>Right. But sometimes success occurs in an unexpected way.</p> <p> In 1988 the Food and Drug Administration of the United States gave approval for Upjohn Company to sell <i>Minoxidol</i> under the brand name <b>Rogaine</b>.</p> <p>It is a drug that promises to grow hair on balding patients. It was developed as a drug to cure <b>hypertension</b>. However, researchers discovered that it had an unexpected <b>side effect</b> — it was regenerating hair on balding patients.</p>
<p>I hear Rogaine is sold as hair growing</p>	<p>When it was first introduced, the price</p>

miracle drug. If it reduced hypertension, it will be a side effect now.

of Rogaine was \$50 per bottle (A patient needs 12 bottles a year.) Patent gives protection only for 17 years.

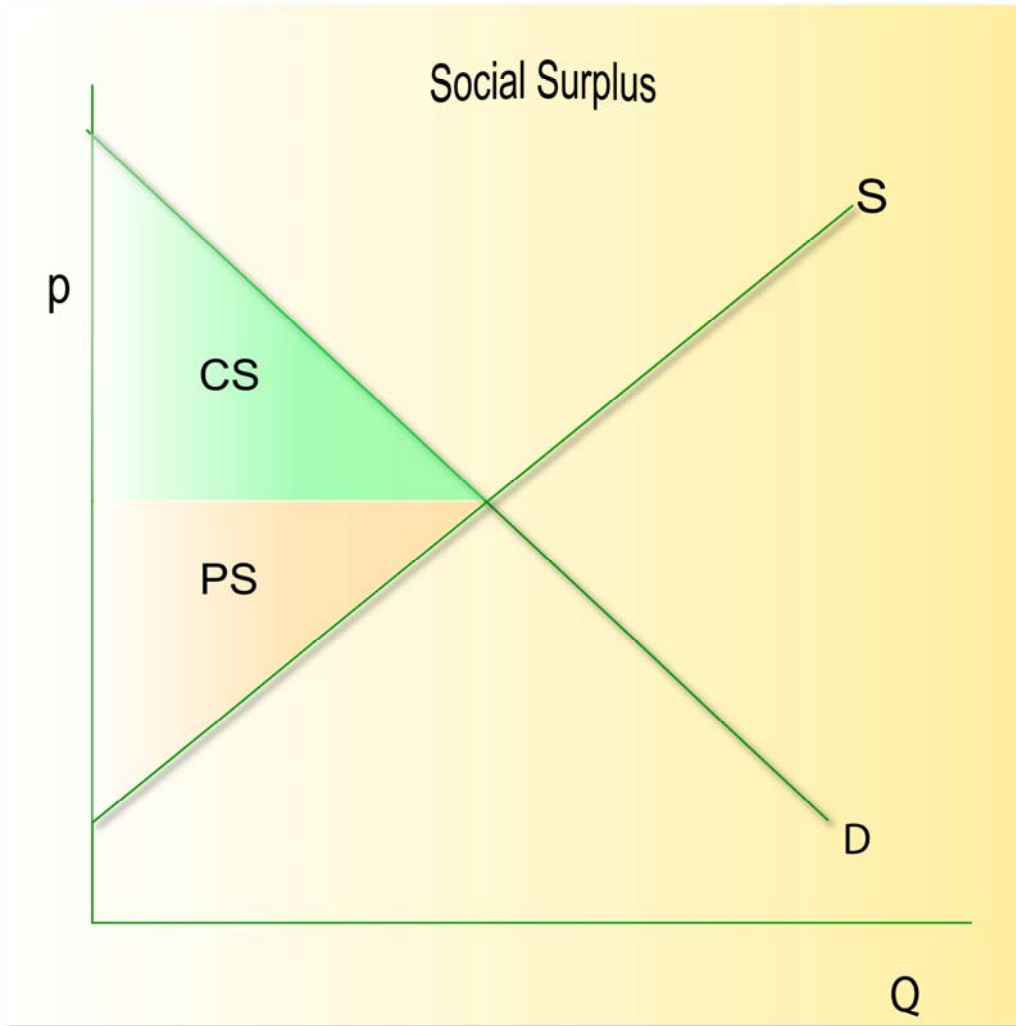


	<p><b>Monopolies may Collapse</b></p> <p>Forty years ago, consumers in the United States had little choice but to use the US postal service to send their letters and packages. In effect, the US Postal Service had a monopoly over mail services. However, during the last 20 years, the US Postal Service has lost much of its monopoly.</p>
<p>That is because close substitutes have become available.</p>	<p>What are its close substitutes?</p>
<p>Packages are now sent through companies like UPS, Federal Express.</p> <p>Personal computers and Fax machines have developed. Fax messages are sent instantaneously.</p> <p>Electronic mail has become a major substitute.</p>	<p>Land and cell phones have become cheaper. More people communicate by cell phones than by letters.</p>

<p>The probability of a successful invention is so small, but we often criticize monopolies for making excessive profits.</p>	<p>Right.</p> <p>As an investor, one needs to weigh the amount of winning a large amount of money against the extremely small probability of success.</p>
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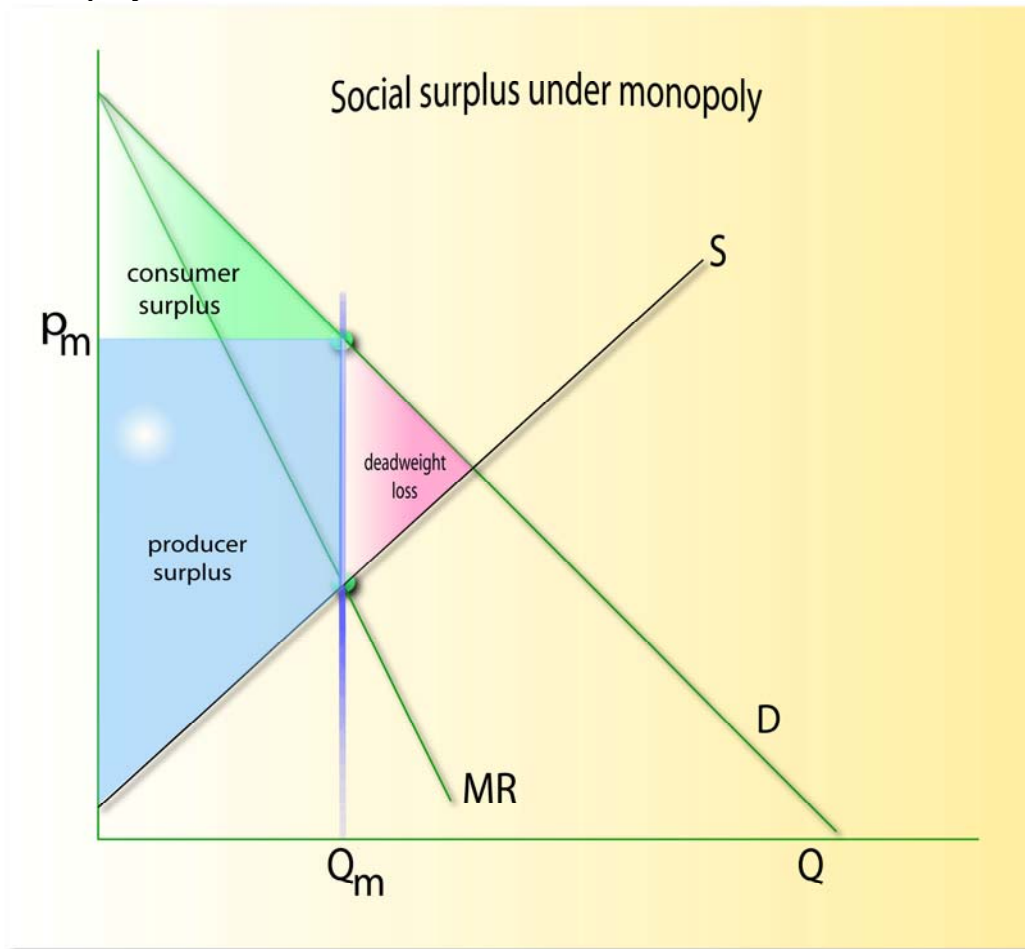
<p><b>WHY IS MONOPOLY BAD?</b></p> <p>because of excessive profit?</p>	<p>No, although in the eyes of the poor, some firms are making excessive profits (this depends on normative judgment).</p>
<p>What if a smart and generous person, like Billy Graham, takes over and give all the profits to a charitable organization?</p> <p>The poor will not criticize such a benevolent monopolist.</p>	<p>Probably not.</p> <p>Nevertheless, economists will still say that monopoly is bad.</p>
<p>Do you mean economists are hard to please?</p>	<p>Right.</p>
<p>What is the reason?</p>	<p>Price and Output</p> <p>Assume: Initially there were N competitive firms.</p> <p>⇒ Now it is replaced by a single seller with N plants.</p>


## Perfect Competition




In competitive markets, market supply curve is a horizontal summation of the individual supply curves. In Figure 7,  $\Sigma MC$  shows the supply curves of  $N$  competitive firms. The intersection of  $\Sigma MC$  and the demand curve yields market equilibrium.

## Monopoly



<p>If all <math>N</math> firms are integrated to form a single monopolist, the monopoly solution is <math>P_m</math> and <math>Q_m</math> as shown above.</p>	<p>You can compare price and output under the two scenarios.</p>
<p> The Monopolist produces less and charges a higher price than in competitive markets.</p>	<p>Right!</p>
<p>But more output is not necessarily better.</p>	<p>Right. We need to compare the two regimes using the social welfare criterion.</p>
<p>What welfare criterion?</p>	<p>We have already studied consumer surplus. But there is also a similar surplus concept applicable to producers.</p>

	<p>Producer Surplus = <math>PQ - VC</math></p>
<p>Comparing the sum of producer and consumer surplus, I see that total surplus is greater under perfect competition by the area of the pink triangle.</p>	<p>Sometimes it is called a deadweight welfare loss due to monopoly.</p> <p>Note that under monopoly <math>p &gt; MC</math>.  <math>p = AR &gt; MR = MC</math>.</p> <p> <math>p</math> is what the society is willing to have one more unit, whereas <math>MC</math> is what the society has to pay for an additional unit. When they are equal, resource allocation is efficient.</p> <p>That is the reason why monopoly is considered bad. Monopoly misallocates resources. Welfare loss is the consequence.</p>

MONOPOLY was invented by Charles Darrow of Germantown, PA during the Great Depression. He took a vacation in Atlantic city, New Jersey. He decided to name the streets of his game board after the streets in Atlantic City. The first games were handmade. But he sold some to department stores. As demand grew, he could not keep up with demand. So he sold the right to publish that game to Parker Brothers. Now Parker Brothers has a monopoly on the "Monopoly."

## DIAMONDS

- De Beers has succeeded in becoming a monopolist in the rough or uncut diamond market for the last century. Currently, it controls about 80 percent of uncut diamond market. It does so either by owning diamond mines or through exclusive contracts to sell the output of other mines it does not own.

- *Control of Essential Resource:* De Beers controls the supply of diamonds through Central Selling Organization (CSO). The CSO offers independently owned mines a choice of two contracts: (1) a guaranteed price for its entire output, or (2) a quota system under which each mine receives a fixed percentage of CSO's profits. Most independent mines select the latter.

The output of its own mine is used as a buffer, and operates only during periods of high demand and shuts down when demand is slack.

- *Pricing:* The CSO then acts as a monopolist. De Beers maintains agents who report the market conditions throughout the world. Choose  $Q$  such that  $MR = MC$ .

- *Output:*

De Beers sells diamonds ten times a year to a select group of 300 diamond buyers throughout the world. This sales ritual is known as "sight." Each buyer is called a sightholder. Before sale each sightholder is asked to submit a shopping list: The sightholder lists the quantity and quality of stones that he wants to purchase. Then De Beers selects the diamonds and put them in each sightholder's box, and then assigns a price tag to each box. The price is usually about half a million dollar. The diamonds in each box does not always match those in the shopping list.

If the price is too high, a sightholder may reject. However, if a buyer rejects too

often, he may not be invited back for future sights.

De Beers' action is what the theory predicts: It controls essential resource, it restricts output and it responds to changes in market demand. When demand contracted in 1980, De Beers cut back on its sales and charged about \$300,000 per box, rather than \$500,000. When market demand recovered, a box cost \$500,000 again. (source lost)

### Changes in Demand

Figure

$P$  and  $Q \downarrow$  in response to a decrease in demand.

