

Market Power: Monopoly and Monopsony

EC 311 - Selby

University of Oregon

Economics

Introduction

- ▶ Up until this point we have been focusing on markets where firms are *price-takers*. That is, their actions have no influence on the market price.
- ▶ The perfectly competitive markets consist of many firms that sell identical products
- ▶ These markets are *stylistic* at one extreme (no market power)
- ▶ We are now going to examine the other extreme, where agents have complete market power.
- ▶ We will focus on monopolies and monopsonies.

Monopolies

- ▶ Define a **monopoly** as a market with only one seller.
- ▶ For the context of an industry with a monopoly firm, the firm *is* the market
- ▶ The object of a monopolist is still to maximize its profit, but it will have more say over the price that it sets.

▶ Average Revenue and Marginal Revenue

- ▶ Recall, a firm's revenue is

$$R = P * Q$$

- ▶ So the **average revenue** is

$$AR = \frac{R}{Q} = P$$

- ▶ Define a firm's **marginal revenue** as the change in revenue resulting from a unit increase in output

$$MR = \frac{dR}{dQ}$$

- ▶ **Example:** Suppose that the demand curve in a market is

$$Q = 6 - P$$

We can rewrite this as $P = 6 - Q$. Then the firm's revenue curve is

$$R = P * Q = (6 - Q) * Q = 6Q - Q^2$$

- ▶ What is the monopolist's average revenue?



$$AR = \frac{R}{Q} = P = 6 - Q$$

- ▶ What is the monopolist's marginal revenue?



$$MR = \frac{dR}{dQ} = 6 - 2Q$$

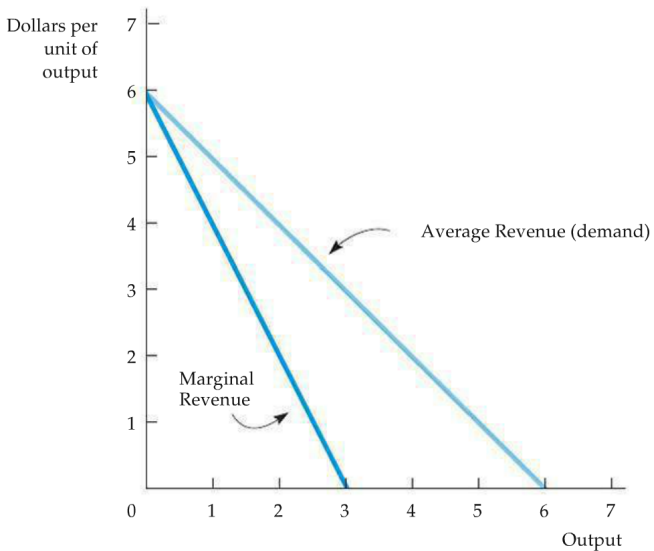
Fill out the following:

P	Q	R	MR	AR
6				
5				
4				
3				
2				
1				

Fill out the following:

P	Q	R	MR	AR
6	0	0	-	-
5	1	5	5	5
4	2	8	3	4
3	3	9	1	3
2	4	8	-1	2
1	5	5	-3	1

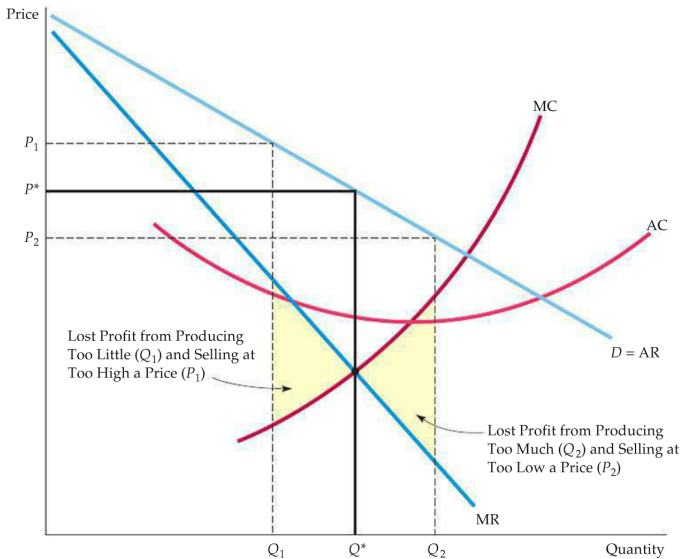
► Graphing the AR and MR curve:



Monopolist Output Decision

- ▶ In the competitive market, $P = MR$, so the demand curve was the same as the marginal revenue curve.
- ▶ For the monopolist, however, the MR curve falls underneath the demand curve.
- ▶ What output should the monopolist produce?
- ▶ Again, this firm should produce where

$$MR = MC$$



In-class examples

Rule of Thumb for Pricing

- ▶ Often times, monopolists have limited knowledge about the average and marginal revenue curves that they face
- ▶ Suppose we write MR as

$$MR = \frac{dR}{dQ} = \frac{dPQ}{dQ}$$

- ▶ Using the product rule, we can write this as

$$MR = P + \frac{dR}{dQ} = P + Q * \frac{dP}{dQ} = P + P \left(\frac{Q}{P} \right) \left(\frac{dP}{dQ} \right) = P \left(1 + \frac{1}{E_D} \right)$$

- ▶ When a firm is profit maximizing, then $MR = MC$

$$P \left(1 + \frac{1}{E_D} \right) = MC$$

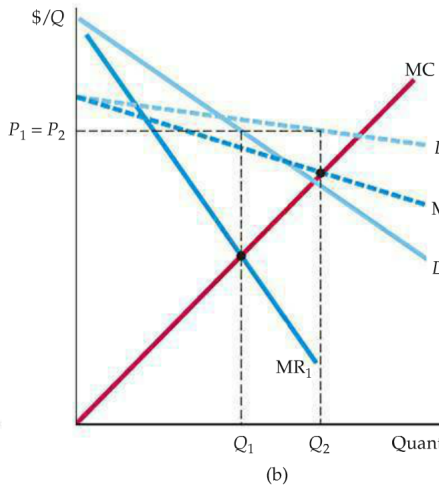
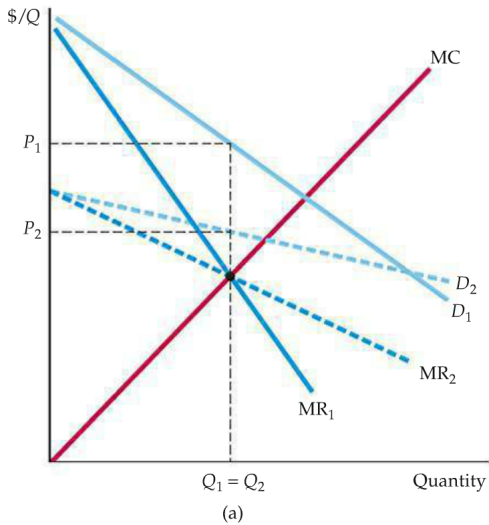
$$\implies Markup = \frac{P - MC}{P} = -\frac{1}{E_D}$$

- ▶ The left-hand side is the ratio of the markup over marginal cost as a percentage of price
- ▶ This states that the markup should be equal to minus the inverse of the price elasticity of demand

In class example

Shifts in Demand

- ▶ A monopolist market has *no supply curve* because there is no one-to-one relationship between price and quantity produced
- ▶ The monopolist's output decision depends on the shape of the demand curve and the firm's marginal cost.
- ▶ Shifts in demand do not trace out series of prices and quantities. This can lead to increases in price but no change to quantity produced.
- ▶ Consider the following:



The Effect of a Tax

- ▶ Suppose the government levies a specific tax of t per unit
- ▶ Then the firm's marginal cost of production increases to $MC' = MC + t$
- ▶ Graphically, this is a shift upward of the marginal cost curve and leads to a new intersection with the MR curve

- ▶ **Example:** Suppose $P = 40 - Q$, $MR = 40 - 2Q$, and $MC = 2Q$. If the government levies a tax $t = 4$, what happens to the output and price?

- ▶ Original price and output:

- ▶ $MR = MC \implies 40 - 2Q = 2Q \implies Q = 10 \quad P = 30$

- ▶ New marginal cost:

- ▶ $MC' = 2Q + 4$

- ▶ New price and output:

- ▶ $MR = MC' \implies 40 - 2Q = 2Q + 4 \implies Q = 9 \quad P = 31$

- ▶ In this example, the change in price is less than the amount of the tax.

Monopoly Power

- ▶ A pure monopoly is exceptionally rare.
- ▶ Instead, we often see a few firms that are in competition with each other
- ▶ But because there is not a lot of competing firms, each one still has some level of **monopoly power**, or the ability to set price above marginal costs.
- ▶ How do we measure monopoly power in general?
- ▶ What are sources of monopoly power?
- ▶ We will briefly discuss this here, but will go into depth in our discussion on monopolistic competition (ch 12)

► Measuring Market Power:

- We use the **Lerner Index of Monopoly Power**, which is the difference between the price and marginal cost divided by price (markup as a percent of price)

$$L = \frac{P - MC}{P} = -\frac{1}{E_d}$$

where E_d is the elasticity of a *firm's demand curve*. (E_D is the elasticity of market/monopolist demand)

- The larger the value of L, the greater the markup and monopoly power
- Suppose that Firm A has $E_d^A = -2$ and firm B has $E_d^B = -1$, then

$$L^A = \frac{1}{2} \quad \text{and} \quad L^B = 1$$

so firm B has more monopoly power

► **Rule of Thumb for Pricing:**

- Like the monopoly, a firm with some monopoly power can follow the rule

$$P = \frac{MC}{1 + \frac{1}{E_d}}$$

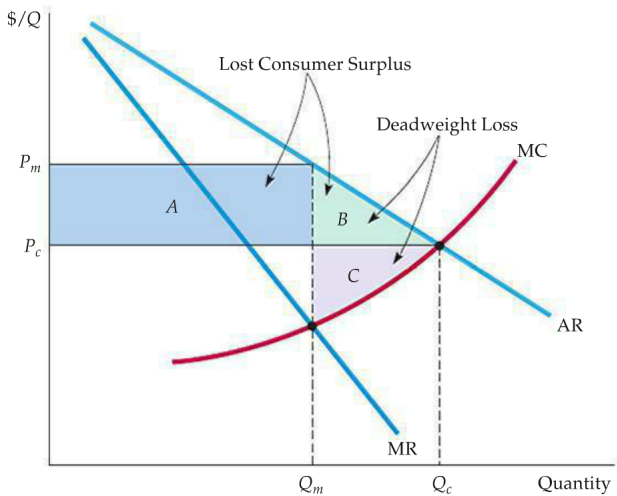
to set its prices if it cannot see its average or marginal revenues, but can see marginal costs and elasticity of demand.

Sources of Monopoly Power

- ▶ Why do some firms have high monopoly power and others little or none?
 - ▶ It depends on the elasticity of demand for a firm's product
 - ▶ Factors that affect elasticity of demand:
 1. **The elasticity of market demand.** The elasticity of a firm will be at least as elastic as the market.
 2. **The number of firms in the market.** As firm's enter, the competition will increase and because consumers can easily substitute between firms, there is little room for price-setting
 3. **The interaction among firms.** If rivalry among firms is high, then none of the firms will be able to raise prices much for fear of losing some of the market

Social Costs of Market Power

- ▶ In a competitive market, price is equal to marginal cost
- ▶ For firms with monopoly power, firms charge a price that is a markup over marginal costs.
- ▶ Due to this, we see some deadweight loss



▶ The welfare changes are:

▶ $\Delta CS = -A - B$

▶ $\Delta PS = A - C$

▶ $DWL = B + C$

▶ $\Delta W = \Delta CS + \Delta PS = -DWL$

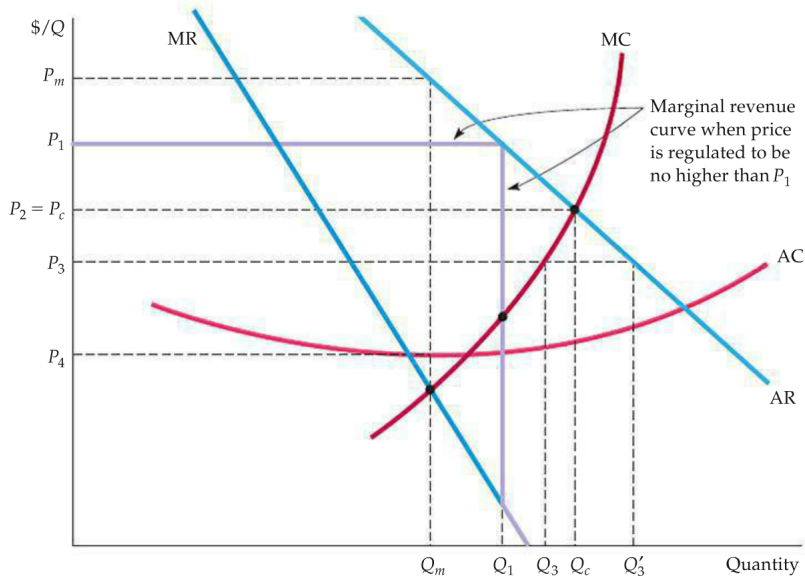
In class example

Rent Seeking

- ▶ Define **rent seeking** as spending money in socially unproductive efforts to acquire, maintain, or exercise monopoly power
- ▶ Examples:
 - ▶ Lobbying activities (like campaign contributions) to obtain gov't regulations to make entry into the market difficult for new firms
 - ▶ Advertising
 - ▶ Legal efforts to avoid being subject to antitrust scrutiny (i.e. laws that prevent monopolistic behaviors)

Price Regulation

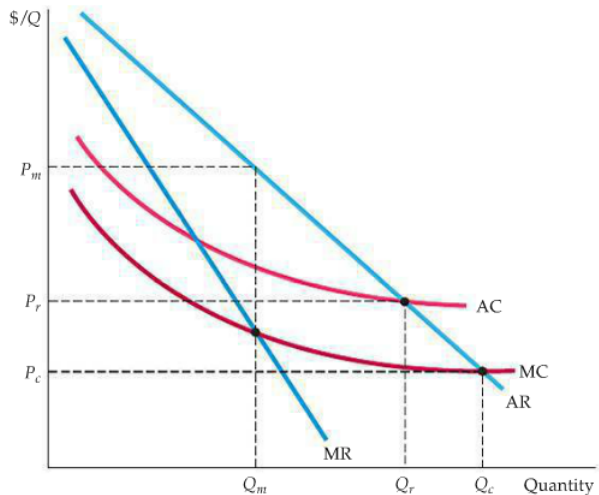
- ▶ Price regulation in a competitive industry leads to social welfare loss.
- ▶ However, if firms in an industry have market power, prices are already causing social costs.
- ▶ Price regulation, in this case, may eliminate deadweight loss
- ▶ Suppose that the government says that a firm can charge a price no more than P_1
 - ▶ Firms that charge prices lower than P_1 are not subject to this regulation



Natural Monopolies

- ▶ There are some types of industries that can produce the entire amount of output in a market at a cost that is lower than if there were several separate competing firms
- ▶ We call these industries **natural monopolies**.
- ▶ These types of industries are often subject to price regulation
 - ▶ As we will see, if the market is unregulated, the monopoly will produce too little and will not be able to cover its average costs.
- ▶ These generally occur when there are strong economies of scale
 - ▶ Recall, economies of scale means that input costs decline with increased output. So AC is declining as q increases

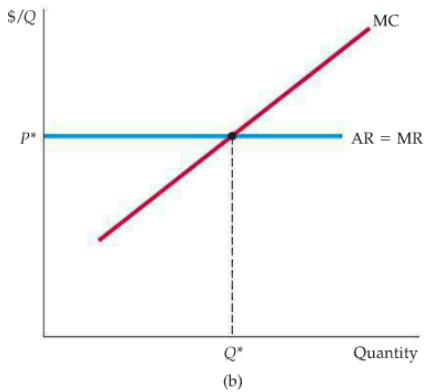
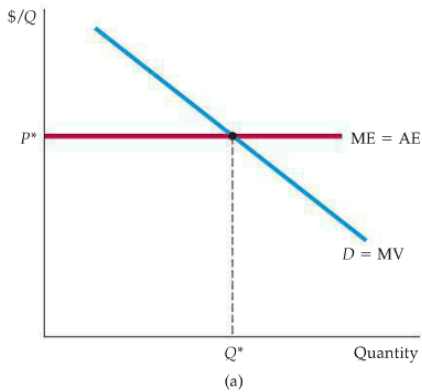
- This is illustrated here:



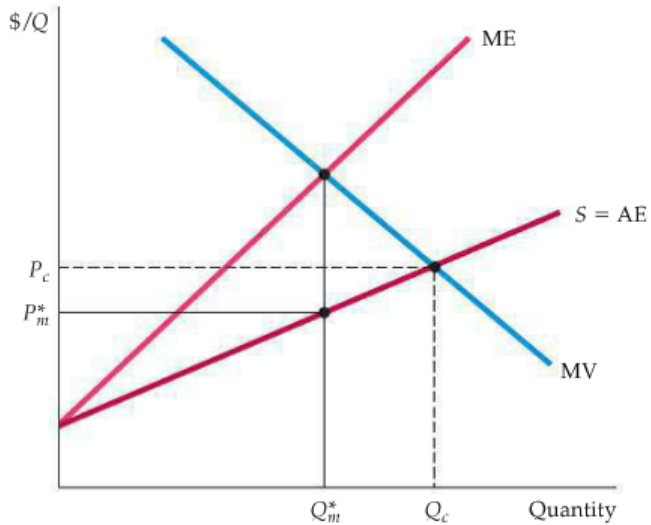
Monopsonies

- ▶ A monopoly had *one seller* and *many buyers*
- ▶ A **monopsony** is an industry that has *one buyer* and potentially many sellers.
- ▶ A less strict case of this is the **oligopsony** which is an industry that has just a couple buyers.
- ▶ Because of this, buyers have the market power. Here we talk about **monopsony power** which is the ability for buyers to affect the price of a good.

- ▶ Define **marginal value** to be the additional benefit derived from purchasing another unit of the good.
 - ▶ The demand curve maps out the consumer's marginal value/utility as a function of the quantity purchased
 - ▶ The marginal value of buying another unit of output is decreasing. Is this intuitive?
- ▶ Define **marginal expenditure** as the additional cost of buying another unit of output.
 - ▶ If you are a competitive buyer or if you have monopsony power
 - ▶ If you are a competitive buyer, you have no say in what the price is because there is always someone else willing to pay less for it
 - ▶ In this case, the cost of buying an additional unit is constant regardless of output.



- ▶ In panel (a), a competitive buyer takes price as given and we set $ME = MV$ to find the optimal output
- ▶ In panel (b), a competitive seller takes price as given and we set $MR = MC$ to find the optimal output
- ▶ If we have a monopolistic seller, we fall into the case that we had just discussed.
- ▶ However, if we have a monoponistic buyer, their AE - which is also the supply curve - is going to always fall below their ME curve and we get the following:



- ▶ Monopsonies buy the amount when $MV = ME$.
- ▶ At this output level, firms only charge P_m^* which is lower than the competitive market price.
- ▶ At this low price, output is also lower than in the competitive equilibrium

Monopsony Power

- ▶ Like monopolies, there are less stringent cases where there are just a few buyers in a market
- ▶ In this case, we can talk about their **monopsony power**, or the ability that a buyer has to affect the price of a good.
- ▶ This depends on the *elasticity of supply*
 - ▶ If the elasticity of supply is low, then the markdown below marginal value is large.
 - ▶ That is, if firms are not responsive to price changes, then monopsonistic buyers can increase the amount of markdown.

► Sources of Monopsony Power

1. **The Elasticity of Market Supply** - The individual firm's elasticity of supply is as least as elastic as the market elasticity
2. **Number of Buyers** - As the number of buyers grows, the greater the amount of competition among buyers and the lower the monopsony power of any particular buyer
3. **Interaction Among Buyers** - If buyers are competing aggressively, even if there are few of them, the amount of say they have over the price declines.

- ▶ **Example:** suppose we look at the employment of TA's by the University of Wherever.

- ▶ Suppose the supply curve (AE) for TA's is such that

$$W = 200 + 3n$$

where n is the number of hired TA's

- ▶ Suppose the demand for TA's (MV) by UW is

$$W = 1,200 - 4n$$

- ▶ Also, suppose that the marginal expenditure curve for TA's is

$$ME = 200 + 6n$$

► **Example, Cont.**

- A monoponic buyer sets $ME = MV$

$$ME = 200 + 6n = 1200 - 4n = MV$$

$$\implies 10n = 1000$$

$$n = 100 \quad \text{and} \quad W = AE(100) = 200 + 3(100) = 500$$

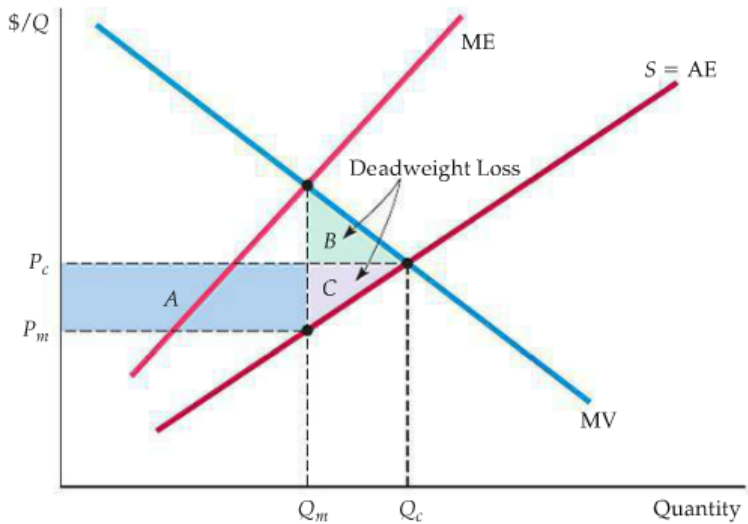
- The marginal value of 100 TAs is

$$MV(100) = 1200 - 4(100) = 800$$

So the university is only paying 500, even though the value of the TAs is higher at 800.

Welfare Implications of Monopsony

- ▶ In the case of a monopoly, the price was set too high and output was too low.
- ▶ In the case of a monopsony, the price is set too low and the output is too low.
- ▶ This results in some deadweight loss



- ▶ Area A is the amount of producer surplus that is transitioned to buyers.
- ▶ Area B is the amount of consumer surplus that is lost from having too little output
- ▶ Area C is the amount of producer surplus that is lost from having too little output
- ▶ So we have the following welfare changes
 - ▶ $\Delta CS = A - B$
 - ▶ $\Delta PS = -A - C$
 - ▶ $DWL = B + C$
 - ▶ $\Delta W = \Delta CS + \Delta PS = -DWL$

In class example

Limiting Market Power

- ▶ As we can see, market power leads to loss of efficiency in the market
- ▶ We might want to discourage monopolistic and monopsonistic power through various regulations.
- ▶ For natural monopolies - like electric utility companies - price regulation is probably the best bet
- ▶ In other cases, if we limit firms ability to create mergers and acquisitions then we can limit the amount of market power that firms can acquire
- ▶ We can also try to prevent firms who have market power from using it to restrict competition.

- ▶ **Antitrust Laws** are rules and regulations that prohibit actions that restrain, or are likely to restrain, competition
- ▶ In the U.S., the Sherman Act prohibits contracts, combinations, or conspiracies in restraint of trade (i.e. explicit collusion)
 - ▶ An example of this would be for firms to make an explicit agreement with each other to restrict output or “fix” price
- ▶ **Parallel Conduct** is a form of implicit collusion in which one firm consistency follows actions of another
- ▶ The Clayton Act prohibits firms with a large market share to prohibit the buyer from purchasing from a competitor.

- ▶ Likewise, the Clayton Act prohibits **predatory pricing**, or the practice of pricing to drive current competitors out of business and to discourage new firms from entering
- ▶ It also prohibits firms from creating mergers and acquisitions if they would substantially reduce competition or tend to create a monopoly.
- ▶ Other various types of antitrust laws:
 - ▶ Prohibit charging different prices for same product if the difference would hurt competition
 - ▶ Federal Trade Commission Act: laws against deceptive advertising/labeling, agreements with retailers to exclude competing brands, etc.

► **Enforcement of Antitrust Laws**

1. Antitrust Division of Department of Justice
2. Administrative procedures of the Federal Trade Commission
3. Private proceedings - individual lawsuits and such