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

\[ R = P \times Q \]

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

\[ R = P \times Q = (6 - Q) \times Q = 6Q - Q^2 \]
What is the monopolist’s average revenue?

\[ AR = \frac{R}{Q} = P = 6 - Q \]

What is the monopolist’s marginal revenue?

\[ MR = \frac{dR}{dQ} = 6 - 2Q \]
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Graphing the AR and MR curve:

- **Average Revenue (demand)**
- **Marginal Revenue**

**Dollars per unit of output**

**Output**
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

\[
MR = MC
\]
Lost Profit from Producing Too Little ($Q_1$) and Selling at Too High a Price ($P_1$)

Lost Profit from Producing Too Much ($Q_2$) and Selling at Too Low a Price ($P_2$)
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

\[ MR = P + \frac{dR}{dQ} = P + Q \cdot \frac{dP}{dQ} = P + P \left( \frac{Q}{P} \right) \left( \frac{dP}{dQ} \right) = P \left( 1 + \frac{1}{E_D} \right) \]
When a firm is profit maximizing, then \( MR = MC \)

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

\[
\implies \text{Markup} = \frac{P - MC}{P} = -\frac{1}{E_D}
\]

- 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
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.
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.
Marginal revenue curve when price is regulated to be no higher than $P_1$. 

$P_1$ is the regulated price, $P_c$ is the competitive price, $P_m$ is the monopoly price, $P_3$ is the price at which $Q_3$ is produced, and $P_4$ is the price at which $Q_3'$ is produced.
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 monopsonistic 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 monopsonistic buyer sets $ME = MV$

\[
ME = 200 + 6n = 1200 - 4n = MV
\]

\[
\implies 10w = 1000
\]

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

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