



Principle Of Microeconomics Note - Lecture notes, chapters 1 - 10, 12 - 20

Principles of Microeconomics (University of Maryland)

Principle of Microeconomics

Lecture note

Chapter 1: Economic of Life

One word to describe economic : **CHOICE**

- Economic is the study of how people manage resources.
- Economic is the study of choices people make.
- It is not all about money.
- Economic is useful in areas traditionally considered outside economics, such as crimes, law, family, etc...
- Decisions made by individuals and also by groups (family, firms...).

Choices and **rational behavior**

Economists assume that people:

- are aware of costs and benefits of all available option
- compare al available choices
- purposefully behave in the way that will best achieve their goals

This is called **rational behaviors**

- This assumption is not perfect but helps to explain a lot about the real world

Two fields in economics

Microeconomics: study of choices individuals and firms make and the implications of these choices

Macroeconomics: study of the economy on a regional, national, or international scale.

People's decisions can be studied using *4 main questions*

1. what are their wants and constraints? (related to the concept of scarcity)
2. what are their tradeoffs (need to give up sth in order to get sth)? (opportunity cost)
3. How will others respond? (+/- incentives)
4. Why isn't everyone already doing it? (efficiency)

1. **Scarcity** (wants vs. constraints)

- Scarcity is the condition of wanting more than we can get with available resources.
- People make decisions aimed at getting the things they want by limited resources.
- Scarcity is the fact of life.
- Individual resources includes time and money.

2. **Opportunity cost**

1. **tradeoffs** between costs and benefits.
2. The cost include both the **direct cost** (involves money) and opportunity cost.

3. The direct cost includes all associated costs.
4. The opportunity cost is the value of what one give up in order to choose something. It is the value of the next best alternative, not he value of all possible alternatives.
5. cost(prize) is **not equal** to value.

Rule of thumb: Choose the activity with lowest opportunity cost and greatest benefit.

Marginal decisions

- In economics, we assume people make choices at every step.
- People compare the additional (marginal) benefits of a choice against the additional costs (not the total cost and total benefit). = referred to as marginal decision making.
- no consideration of past benefits or costs, both referred to as sunk.
- **sunk costs:** costs that already have been incurred and cannot be recovered.

3. Incentives

- rational behavior suggests that people respond to incentives.
- An incentive is something that causes a change in the tradeoffs that people face.
- **positive incentive:** makes people more likely to do sty by lowering their opportunity cost.
- **negative incentive (disincentive):** makes people less likely to do something.

4. Efficiency

- Efficiency is the use of resources in the most productive way possible to produce the goods and services that have the greatest total economic value to society.
- under normal circumstances, individuals and firms seek opportunities to get what they want (more money?).
- If a profit-making opportunity exists, someone will provide the good or service.

Sometimes economics **do not** operate efficiently:

(causes of inefficiency)

- *Innovation*: yet to be discovered innovations/ideas increase efficiency.
- *Market failure*: peole and firms may be prevented from capturing the benefits of the opportunity or incur additional costs.
- *Intervention*: interventions in the economy causes transaction to not take place. most often government policies.
- *Goals other than profit*

Problem-solving Toolbox

1. Accurately spotting the fundamental economic concepts at work in the world is come times difficult.
2. Economic analysis requires:
 1. theory to be combined with observations
 2. Scrutiny of both theory and observations before drawing conclusions.
- In applying the 4 concepts (noted above), keep an eye on:

1. The difference between correlation and causality.
2. Characteristics of a good economic model
3. distinguish between positive and normative analysis

Correlation and causation

There are 3 reasons why an assumed causal relationship may be false:

1. **Correlation without causation** - Two events may be extremely correlated, making it appear that a causal relationship exists.
2. **Omitted variable** - 2 events may be extremely correlated due to a third event causing the 2.
3. **Reverse causation** - sometimes it is unclear whether Event A causes Event B or if Event B causes Event A.

Models

Economic **models** show how people, firms, and government make decisions about managing resources, and how their decisions interact.

- Models are a **simplification** of complex problems.
- Models include:
 1. Groups of individuals and their choices
 2. markets to study
- What makes a model useful?
 1. makes clear assumptions
 2. describes the real world accurately.
 3. predicts cause and effect

Chapter 2: Production Possibility

Production possibility

- self-interest people (and countries) can cooperate and be better off
- model analyzes who produces which good
- producing more of one thing is possible only by producing less of something else
- Assumptions:
 - 2 groups: producers and consumers
 - 2 goods being produced
 - each producer has their own production technology. (technology can be proprietary)

The production possibility frontiers

A country's production capabilities can be modeled using the **Production Possibilities Frontier (PPF)** (sometimes called production possibilities curve)

- the example of producing wheat and shirts in various production possibilities
- The production possibilities frontier** is the line or curve that shows all possible combination of 2 outputs that can be produced using all available resources

Attainable points are points on the line and inside the line, means that if we allocate our resources we can reach this possibility.

Points inside the line are called **inefficient points** because we are not using our resources inefficiently. These points can be improved by improving efficiency.

Points on the line are called **efficient points** because we are using our resources efficiently.

Unattainable points (points outside of the line) can't be reached because there aren't enough workers, or time, or any other resources.

If the country is producing on the PPF, producing more of one good requires giving up some of the other good.

Opportunity cost (O.C.)

opportunity cost of commodity (say, wheat) is the amount of the other commodity (say, shirt) a country has to give up, per unit.

O.C. = Give up / gain

The trade-off between producing more of one good and less of another is the opportunity cost.

example: the O.C. of 1 shirt is 2 bushels of wheat.

the O.C. of one another is the reciprocal of each other.

Convex PPFs

- The previous PPFs assumed that inputs are able to be transferred between production processes at a **constant rate** (PPF is a straight line)
- It is likely that some inputs are better suited for making shirts, while others inputs are better suited for farming.
- What happens to the shape of the PPF transferring inputs between production processes is costly?
- PPF is bowed out.

The opportunity cost of producing an additional unit of a good typically increases as more resources (workers, in this case) are allocated to its production.

At each point of the curved production possibility frontier, the slope represents the opportunity cost of producing more t-shirts.

Bowed-out PPR shows the **law of increasing opportunity cost**. Or the **Law of low-hanging fruits**.

(low hanging fruits are picked up first, then spend more time (increasing O.C) to pick the fruits that are higher.)

Shifting the PPF

The PPF shifts when resources are adjusted.

- An increase in available resources shifts the entire frontier outward, so does the change in technologies that effect all activities.
- An improvement in technology for one good rotates the frontier outward (ex. tech for better production of shirts has no effect on the production of wheat)
- It is possible to increase both wheat and shirt production with an increase in technology to produce shirts.

Absolute and comparative advantage

- The PPF illustrates the key trade-offs faced by one economy.
- If there is no trade between economies, then what a country produces is what it consumes.
- Using the understanding of PPFS, the analysis can be extended to understand how countries decide what to produce.

Comparative advantage

Suppose that an american worker can produce 50 shirts or 200 bushels of wheat per day. A Chinese worker can produce only 25 shirts or 50 bushels of wheat.

To understand how each country decides which good to produce when they interact, the opportunity costs are calculated:

- US: 1 shirt costs 4 bushels of wheat
- China: 1 shirt costs 2 bushels of wheat.

Using the reciprocal of the above opportunity costs:

- US: 1 bushels of wheat costs 1/4 shirt of wheat
- China: 1 bushel of wheat cost 1/2 shirt of wheat.

O.C. of one unit of:	Shirts	wheats (bushels)
American Worker	4 b of wheat	0.25 shirts
Chinese worker	2 b of wheat	0.5 shirt

Chinese workers can produce shirts at lower cost.

American workers can produce wheat at lower cost.

A country has a comparative advantage in a good if it can produce it at a lower opportunity cost than other country.

- shirts: China has a comparative advantage in shirt production over the U.S,
- Wheat: U.S. has a comparative advantage in wheat production over China.
- NO country has a comparative advantage in both good production.

Example:

Nate: 4 phil or 10 Econ (in 4 hr)

Hafeez: 8 phil or 4 Econ (in 4 hr)

The OC of one Econ for Nate and Hafeez are

0.4 Phil (Nate) and 2 phil (Hafeez)

O.C	Phil	Econ
Nate	2.5 Econ	0.4 Phil
Hafeez	0.5 Econ	2 Phil

Conclusion: Nate should specialized on Econ and Hafeez on Phil

Production without specialization

Suppose the U.S. has 150 million workers and chinas has 800 millions workers

3. in isolation, each country reduces and consumes on its own.

4. resources should be allocated to these 2 activities:

5. U.S. : 100 million workers produce shirts and 50 million workers produce wheat

6. China: 400 million produce shirts and 400 million produce wheat.

	Wheat	Shirt
US	$50 \times 200 = 10,000$ million = 10 billion	5 b
China	20 b	10 b
Total	30 b	15 b

Production with specialization

If each country specializes by producing the good for which it has a comparative advantage, total production increase

if US specialize in wheat and CHina in shirt

Total 30b wheatand 20 b shirt

Why trade?

Gains from Trade

the US produces 30 b bushels of wheat, keeps 10 b and trades 20 b bushels of wheat for 7.5 b shirts.

With specialized production, consumption is outside of the PPF.

Comparative advantage and slope of PPF

Comparative advantage are presented by SLOPEs of 2 production possibility frontiers

- OC of shirt (horizontal axis) is the slope of OOP
- OC of Wheat (vertical axis) is the inverse slope of PPF. (It is lower for the US)
- (Slope is negative, OC is absolute value of it)

Total production without specialization in Nate and Hafeez's case

Total production :6 Phil AND 7 Econ

Total production with specialization (each student can only work on one activity)

Nate should specialized on Econ and Hafeez on Phil

Total production : 8 Phil and 10 Econ

What is the gain from specialization and trade?
2 Phil and 3 Econ

consumption:

lets trade 4 Econs for 4 Phils (one to one)

Consumption will be :

Hafeez ; 4 phils and 4 Econs

Nate: 6 Econs and 4 Phils

Both students can obtain the unattainable points if they trade

Absolute advantage

- The U.S. has an absolute advantage in shirt production since a U.S. worker can produce more shirts than a Chinese worker.
- The U.S. has an absolute advantage in wheat production since a US worker can produce more wheat than a chinese worker.

Absolute advantage does not matter for specialization and trade.

if slopes are the same, there is no advantage in production.

Chapter 3: Market

Markets

- In an economy such as the US economy, resources (input, goods, and services) are mostly allocated through markets.
- Non-market allocations
- A **market** refers to the **buyers** and **sellers** who trade a particular good or service
- - markets can be located locally, globally, or even virtually.
- One special class of market is the **competitive market**.
- In this chapter, markets are assumed to be perfectly competitive.

Perfectly competitive Market

- Perfectly competitive market is a benchmark and not realistic.

Four characteristics of perfectly competitive market:

- **Standardized good** :interchangeable (sugar in pink package is the same kind of sugar in blue package)
- **No transaction costs**: free participation in exchange
- **Full information**: about price and features
- **Participants (buyer and producer) are price takers**: no power to change price as a producer or a consumer

Demand

5. As a group, consumers determine the **demand** for a product.
6. The **quantity demanded** is the amount of a particular good or service that buyers are willing and able to purchase at a given price.
7. The **law of demand** states that the lower the price, the higher the quantity demanded,

all other things equal.

The demand schedule

- A **demand schedule** displays the quantities demanded at various prices
- This demand schedule provides the quantity of cellphones demanded at specific prices
- Notice that as price falls, the quantity demanded increases.

The demand Curve

The **demand curve** illustrates the relationship between the quantity demanded and the price of the good, holding all of the other non-price determinants constant.

Another interpretation of demand

- Everyone has a value for cell phone. It is called **reservation price**.
- Every point on demand curve represents the **marginal value** of cell phone for one person.
- There are 30 million people who value cell phones more than or equal \$180
- There are another 30 million people who value cell phones between \$160 and \$180

cell phones (millions)	Price
30	180
60	160

Changes in demand

The five most important non-price determinant demand are:

- **Preferences**
- **Number of buyers (more buyers increases demand)**
- **incomes**
- **expectation (about the future cost of the good)**
- **price of related goods (substitutes or complements)**

What happens when one of the non-price determinants changes?

- If positive influence, demand increases
- If negative influence, demand decreases

Substitute goods: you may use one in place of the other

Complements: you usually use them together. Ex. peanut butter and jelly should be bought together, increase in the price of peanut butter might change the demand of jelly.

Shifting the demand Curve

- When demand increases, the demand curve shifts to the right.
- When demand decreases, the demand curve shifts to the left

Shifts versus movements

There is an important difference between a shift in the demand curve and a movement along the demand curve

If a non-price determinant changes, then the demand curve shifts left or right with changes in the quantity demanded at every price.

If the price decreases, then quantity demanded increases and there is a movement along the demand curve

Determine whether the following example causes shift or movement.

1. Advertising causes individuals to prefer cellphones over home phones.

Answer: shift. Because a non-price factor (preference) changes.

2. cellphones go on sale

Answer: Movement. because price changes.

Supply

- As a group, producers determine the supply of a product.
- The **quantity supplied** is the amount of a particular good that producers are willing and able to produce at a given price.
- The **law of supply** states that the higher the price, the higher the quantity supplied, all other things stay constant.

The supply schedule (the whole curve)

7. A supply schedule displays the quantities supplied at various prices.

8. This supply schedule provides the quantity of cellphones supplied at specific price.

The supply curve

The curve is going up

Another interpretation of supply

- Every producer has a cost for producing cell phone, it is called reservation price.
- Every point on supply curve represents the marginal cost of producing one cell phone.

Changes in supply

5 most important non-price determinants of supply:

- Technology
- number of producers
- price of inputs (price of electronic chip decreases)
- expectations
- price of related goods (inputs)

Shifting the supply curve

4. When supply increases, the supply curve shifts to the right

5. When supply decreases, the supply curve shifts to the left

Shifting versus movements

If a non-price determinant changes, then the supply curve shifts with changes in the quantity supplied at EVERY price.

If the price decreases, then quantity supplied decreases and there is a movement along the supply curve.

1. A new Chinese cellphone manufacturer enters the market

Shift. Because a non-price factor (number of producers) changes.

2. producers expect a new regulation in using specific material in producing cell phones that increases the cost of production

Shift. Because a non-price factor (price of input) changes.

Markets exist because:

Demanders have demand (they are willing to pay money to have things)

Suppliers have supply (they are willing to accept money to sell things)

As long as there are demanders and suppliers, there will be markets (producers sell things to consumers)

Market equilibrium: supply meets demand

The equilibrium price is \$100

The equilibrium quantity is 150M

Market is **CLEAR** at \$100 (quantity supplied = quantity demanded)

At the market equilibrium point, the quantity supplied equal the quantity demanded.

The equilibrium is where the supply curve intersects the demand curve.

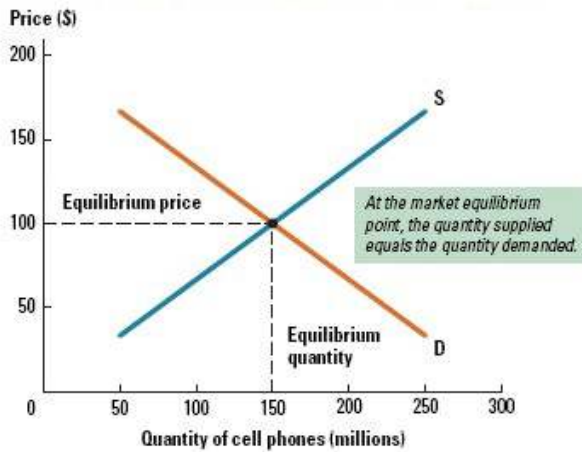
At this point, consumers are willing to buy exactly what producers are willing to sell.

At price of \$100, quantity demanded is equal to quantity supplied.

Equilibrium: No incentive to change. If there is no external force, equilibrium will not change.

FIGURE 3-5

Market equilibrium in the U.S. market for cell phones



The point where the supply curve intersects the demand curve is called the equilibrium point. In this example, the equilibrium price is \$100, and the equilibrium quantity is 150 million cell phones. At this point, consumers are willing to buy exactly as many cell phones as producers are willing to sell.

Disequilibrium

- What happens when it's not in equilibrium

A surplus (excess supply)

- If the price is above equilibrium price, excess supply occurs and there is a surplus of the good or service.
- A lower price alleviates (eases up) the surplus.
- A surplus provides incentives for the price to decrease
- As the price decreases 1) The quantity supplied decreases, 2) the quantity demanded increases.
- The process continues to decrease until quantity supplied = quantity demanded

A shortage

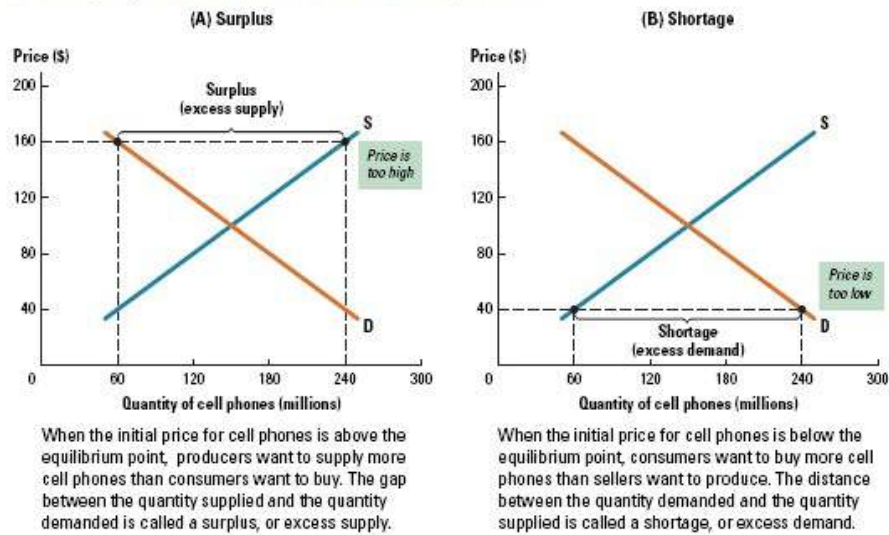
- If the price is below equilibrium price, excess demand occurs and there is a shortage of the good or service.
- A higher price alleviates the shortage.
- A shortage provides incentives for the price to increase
- As the price increases: 1) The quantity supplied increases, 2) the quantity demanded decreases

Price set below equilibrium is called ceiling (cannot go above)

Price set above equilibrium is called floor (cannot go below)

FIGURE 3-6

Reaching equilibrium in the market for cell phones



Changes in market equilibrium

- The equilibrium price and quantity are determined by the intersection of the demand and supply curves.
- If a non-price factor changes, this affects the market equilibrium
- To determine the effect on market equilibrium, there are three questions that must be answered:
 - - Does the change affect demand? if so how?
 - - Does the change affect supply? How?
- What happens to equilibrium price and quantity?

Shifts in demand

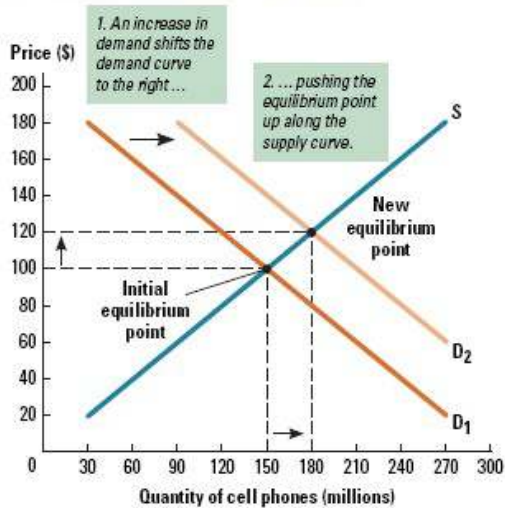
Supposes the price of land-line service suddenly skyrockets

Market for cellphones is in equilibrium

- More expensive substitute causes the demand to increase
- The demand curve shifts right
- The market equilibrium changes: equilibrium price increases, equilibrium quantity increases.

FIGURE 3-7

Shift in the demand for cell phones



When an external factor increases the demand for cell phones at all prices, the demand curve shifts to the right. This increase in demand results in a new equilibrium point. Consumers purchase more cell phones at a higher price.

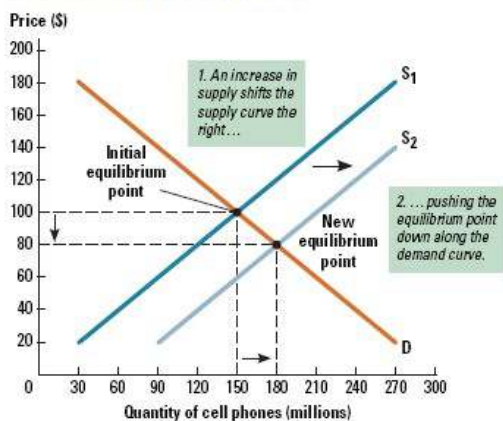
Shifts in supply

suppose there is a breakthrough in battery technology

- technology causes the supply to increase
- shifts the supply curve to the right
- equilibrium price changes.

FIGURE 3-8

Shift in the supply of cell phones



When an external factor affects the supply of cell phones at all prices, the supply curve shifts. In this example, supply increases and the market reaches a new equilibrium point. Consumers purchase more phones at a lower price.

If cost of input increases, causes a decrease in supply
the supply curve shifts left

Four rules:

Rule 1

An increase in demand will lead to an increase in both equilibrium price and quantity

Rule 2

A decrease in demand will lead to a decrease in both equilibrium price and quantity

Rule 3

An increase in supply will lead to a decrease in equilibrium price and increase in the equilibrium quantity

Rule 4

An decrease in supply will lead to an increase in the equilibrium price and decrease in equilibrium quantity.

Shifts in both demand and supply

- it is possible for non-price facts that influence both demand and supply at the same time
- This leads to shifts in both demand and supply
- The new equilibrium occurs relatively to the shift of demands and supply

Chapter 4: Elasticity

Elasticity

- a measure of the responsiveness or sensitivity to a change in a market condition.
- The concept applies to supply and demand.
- It measures the response to a change in:
 - - price of the good
 - - price of the related good
 - - income

Price elasticity of demand

- The price elasticity of demand measures the magnitude of change in the quantity demanded from a change in its price. In other word, it estimates price sensitivity.

Definition of price elasticity of demand

$E = \% \text{ change of quantity} / \% \text{ change of price.}$

Equation 4-1

$$\text{Price elasticity of demand} = \frac{\% \text{ change in } Q \text{ demanded}}{\% \text{ change in } P}$$

HINT

A *percentage change* is the difference between the starting and ending levels divided by the starting level, expressed as a percentage. So a percentage change in quantity would be expressed as:

$$\text{Percentage change in quantity} = \left[\frac{(Q_2 - Q_1)}{Q_1} \right] \times 100$$

Similarly, a percentage change in price would be expressed as:

$$\text{Percentage change in price} = \left[\frac{(P_2 - P_1)}{P_1} \right] \times 100$$

If we plug the original and new quantities and prices into **Equation 4-1**

The **midpoint method** calculates the elasticity at the midpoint of any 2 points. Always use the midpoint method!

Price elasticity of demand is always negative (because the curve goes downward).

Price elasticity of supply is always positive (because the curve goes upward).

Determinants of price elasticity of demand

- Consumers are more sensitive to price changes for some goods and services than for others.
- Many factors determines consumer's responsiveness to price changes.
- - **availability of substitutes**
- - **Degree of necessity**
- - **cost relative to income**
- - **adjustmen time**
- Scope of the market (how broad or narrow we define markets, e.g. market for apple or market for fruits)

Categorizing elasticities

- All goods and services can be broadly categorized based on elasticity.
- At the extremes, demand can be either perfectly elastic or perfectly inelastic.

The relationship between P,Q,TR, and Ed is summarized as follows **for a liner demand curve**.

FIGURE 4-3

Elastic, inelastic, and unit-elastic demand

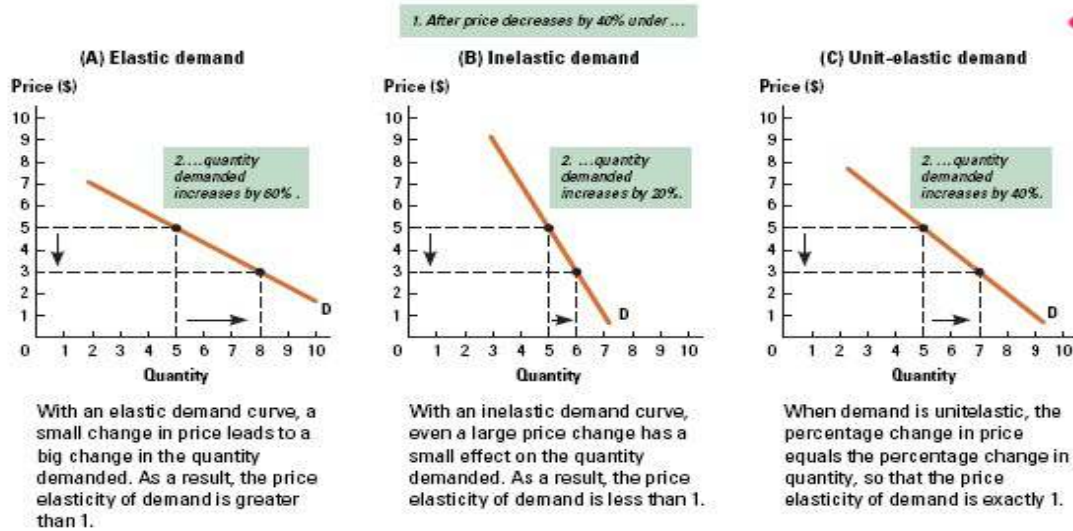


FIGURE 4-6

Changes in elasticity along the demand curve

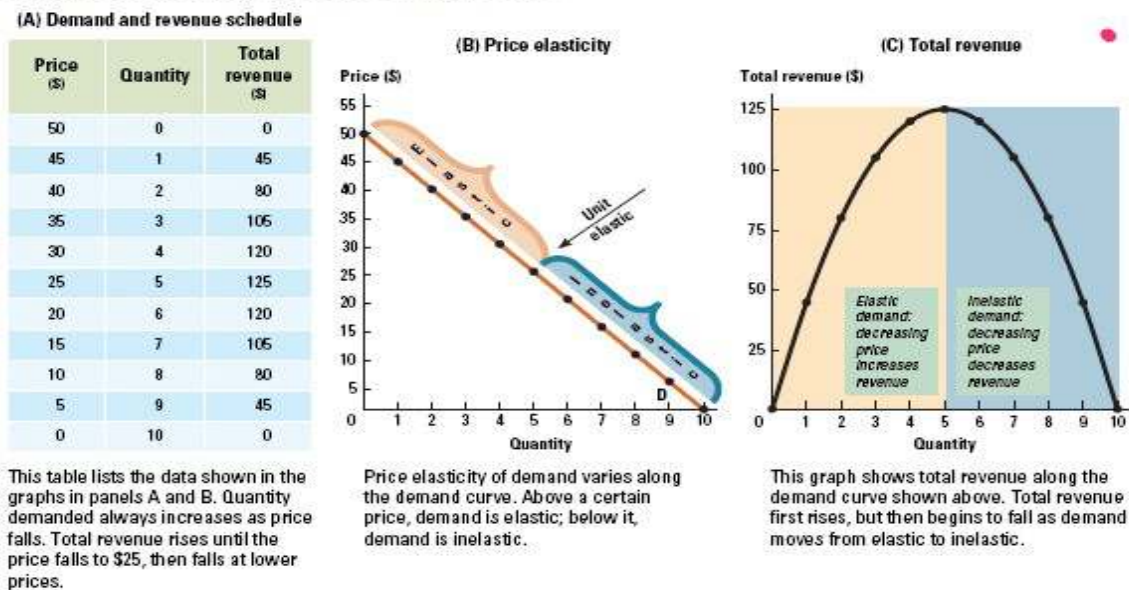
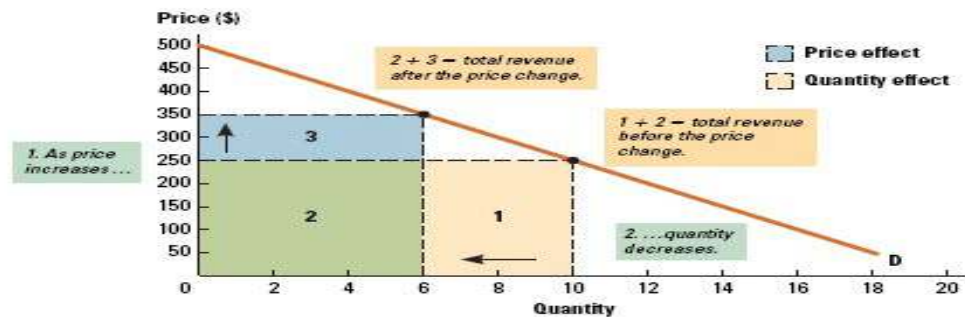


FIGURE 4-4

Effect of a price increase on total revenue



The colored rectangles represent total revenue at two different prices. As the price increases from \$250 to \$350, total revenue is affected in two ways. The blue rectangle represents the increase in revenue received for each unit sold (the price effect). The yellow rectangle represents the decrease in total revenue as the number of units sold drops (the quantity effect). The elasticity of demand determines which effect is larger. In this case, the yellow area is larger than the blue area, meaning that the quantity effect outweighs the price effect, and total revenue decreases.

Using price elasticity of demand

- Knowing whether the demand for a good is elastic or inelastic is extremely useful in business.
- - allows managers to determine whether a price increase will cause **total revenue** to rise to fall.
- **Total revenue** is the amount that a firm receives from the sale of goods and services, calculated as the quantity sold multiplied by the price paid for each unit.

Price elasticity of supply

- The concept of elasticity can also be applied to supply.
- The price elasticity of supply measures producers' response (in quantity) to a change in price
- Uses same midpoint formula but replaces quantity demanded with quantity supplied
- Elasticity is always positive
- Same interpretation:
- Elastic: slope of the midpoint > 1
- Unit Elastic slope $= 1$
- Inelastic: slope < 1

Determinants of price elasticity of supply

- **Availability of inputs**
- **Flexibility of the production process**
- **Adjustment time**

Cross-price elasticity of demand

- a measure of how the quantity demanded of one good changes when the price of a different good changes.

- Can be positive or negative.
- slope >0 : the 2 goods are **substitutes**
- slope <0 : the 2 goods are **complements**

Income elasticity of demand

- A measure of how much the quantity demanded changes in response to a change in consumers' incomes.
- Can be positive or negative
- slope >0 : the good is **normal**.
- Slope >1 : good is a **luxury**
- Slope <0 : the good is **inferior**

Chapter 5: Efficiency

- Consumers many times are willing to pay more than the market price, if the price is below their maximum **willingness to pay**.
- Producers likewise are willing to sell for less than the market price, if the price is above their **minimum willing ness** to sell.
- Voluntary exchange create value and can make everyone involved better off.

Consumer surplus

- the consumer surplus can be calculated by summing up individuals' consumer surplus.
- If there is more than one customer at each plus, simple multiply the number of ncusomers at each price by individual surplus.

Producer surplus

- the producer surplus can be calculated by summing up individuals' producer surplus.

Total surplus or social surplus

Total surplus (the value of the existence of the market) is the combined benefits that everyone receives from participating in an exchange of goods or services.

- total consumer surplus is equal to the area underneath the demand curve and above the equilibrium point.
- total producer surplus is equal to the area above the supply curve and underneath the equilibrium point.

Market equilibrium and efficiency

- The market equilibrium is the point that maximizes total well-being (total surplus) of all participants in the market.

market equilibrium and efficiency

- lowering the price from the market equilibrium price decreases total surplus.

Changing the distribution of total surplus

- When an artificial price is imposed on a market, surplus is transferred between consumers and producers.

"Missing" Market : When there are people who would like to make exchange but

cannot, for one reason or another, we are missing opportunities for mutual benefit.

Chapter 6: Government Intervention

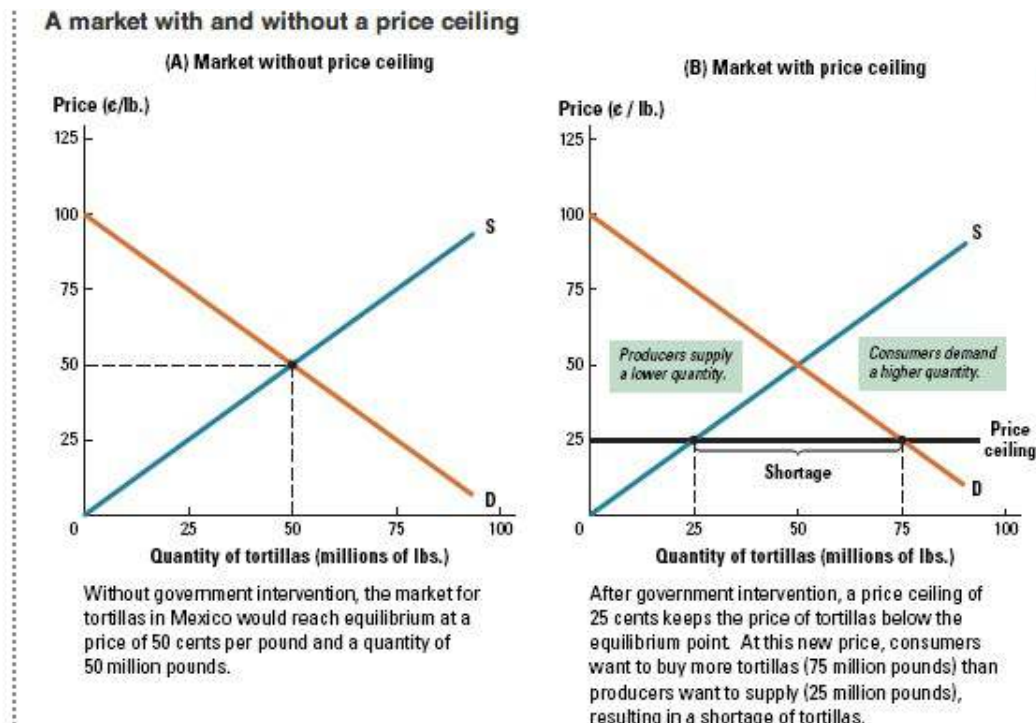
Why intervene?

- Markets gravitate toward equilibrium.
- When markets work well, prices adjust until the quantity of the good demanded is equal to the quantity supplied.
- There are 3 reasons why a government may step in and intervene in a market:
 - - Correcting **market failures** (The situation in which the assumption of efficient competitive markets fails to hold)
 - - Changing the **distribution** of benefits (by imposing minimum wages policy)
 - - **Encouraging or discouraging** consumption of certain goods.

Price Controls

- a regulation that sets a maximum or minimum legal price for a particular good.
- can be divided into categories:
 - Price ceiling - A maximum legal price at which a good can be sold.
 - - Typically placed on essential goods and services such as food, gasoline, and electricity.
 - Price floor - The minimum legal price at which a good can be sold.

Suppose the Mexican government imposes a price ceiling of \$0.25 on tortillas. What effects does this have on the market?



Good or bad?

Did the price ceiling meet the goal of providing low-priced tortillas to consumers?

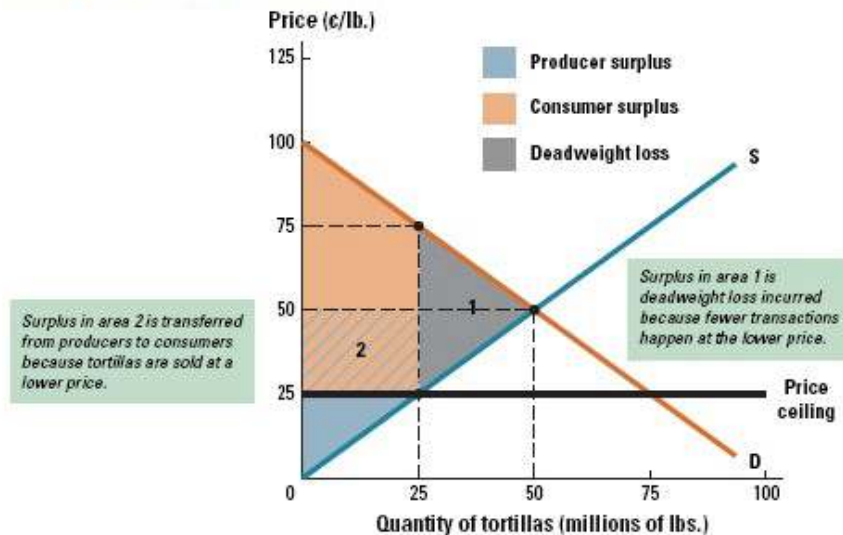
Yes. Consumers were able to buy some tortillas at the low price of \$0.25 a pound.

No. Consumers wanted to buy 3 times as many tortillas as producers were willing to supply.

Welfare effects of a price ceiling

- A price ceiling causes a deadweight loss to occur as well as a transfer of welfare from producers to consumers.
- Suppose the government sets the price at \$0.25.
- Reduction in tortillas sold by 25 million

Welfare effects of a price ceiling



The price ceiling causes the total quantity of tortillas traded to fall by 25 million relative to equilibrium. This results in deadweight loss. The price ceiling also causes surplus to be transferred from producers to consumers: Consumers win because they pay a lower price, and producers lose because they sell at a lower price.

Are price ceilings worth the decrease in total surplus?

Normative question about which people can disagree.

Because a price ceiling causes a shortage, goods must be rationed,

- Rationed equally,
- first-come first served basis
- rationed to those who are given preference by the government, or to the friends and family of sellers.

Shortage causes people to engage in **rent-seeking behavior (bribe)**

Ineffective price ceiling

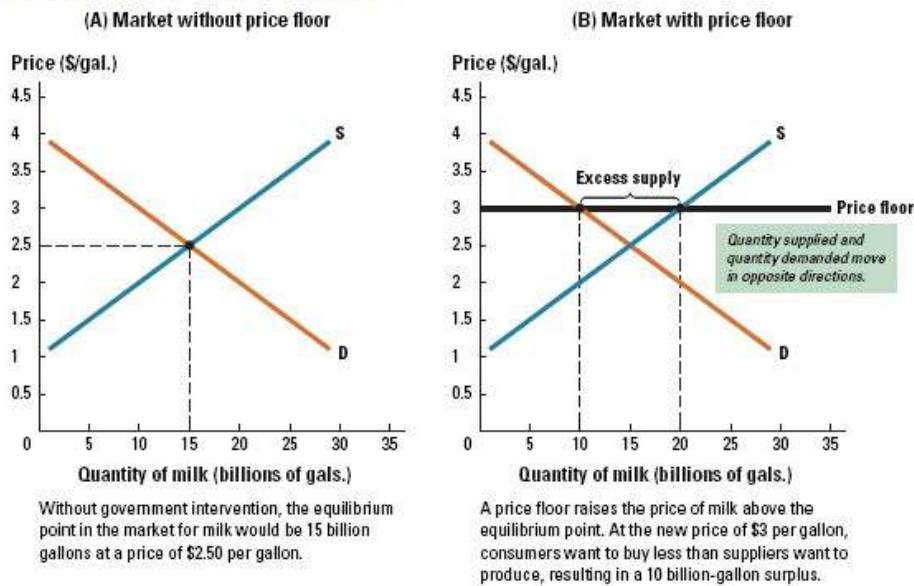
A price ceiling does not always affect the market outcome if the ceiling is set above the equilibrium price. Becomes non-binding.

Price Floor

Suppose the U.S. government imposes a price floor on milk. What effect does this have on the market?

FIGURE 6-4

A market with and without a price floor



Good or bad?

- Yes. Producers were able to sell some milk at a higher price of \$3.0 per gallon.
- No. Some producers may not be able to sell all of their milk because demand no longer meets supply.

Welfare effects of price floor

A price floor causes a deadweight loss to occur as well as a transfer of welfare from consumers to producers.

Dead Weight Loss (DWL)

DWL = (consumer surplus + producer surplus) before - (consumer surplus + producer surplus) after

Taxes

2 primary effects

1. **Discourage production and consumption** of the good that is taxed.
2. Raise government **revenue** through the fees paid by those who continue buying and selling the good.

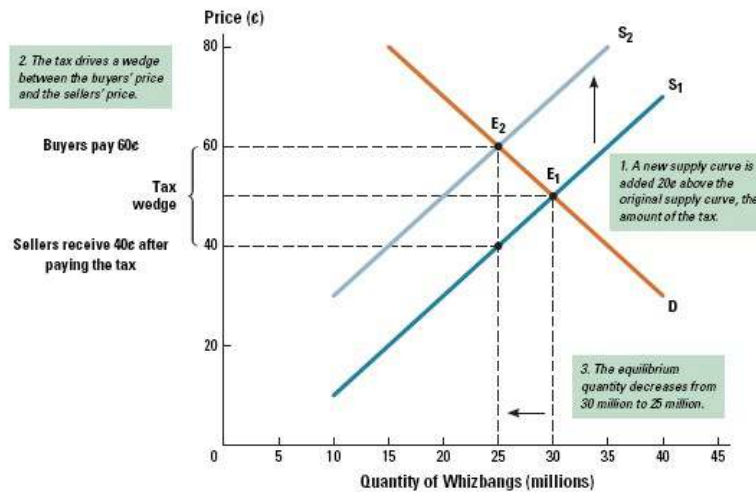
A tax will reduce consumption and provide a new source of public revenue.

Effects of tax paid by the seller

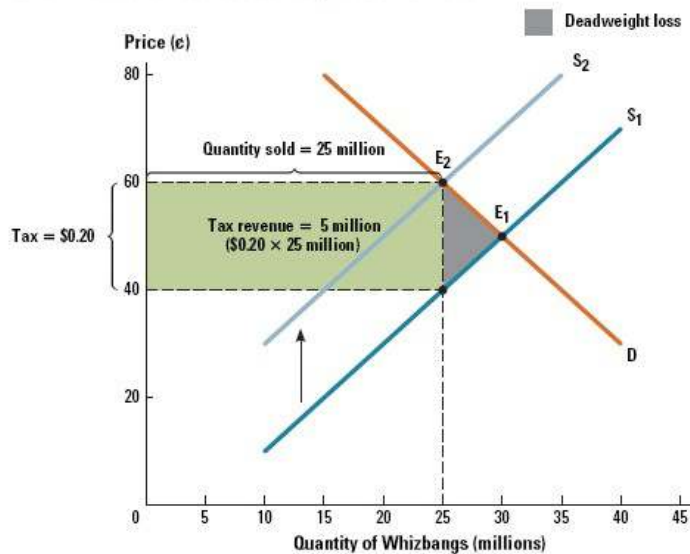
- The new supply curve adds tax to all prices, changing the y-intercept of the line.
- Taxes drives a **wedge** between the buyer's price and the seller's price.

FIGURE 6-7

Effect of a tax paid by the seller



- The tax revenue and deadweight loss from the tax on sellers can be calculated.

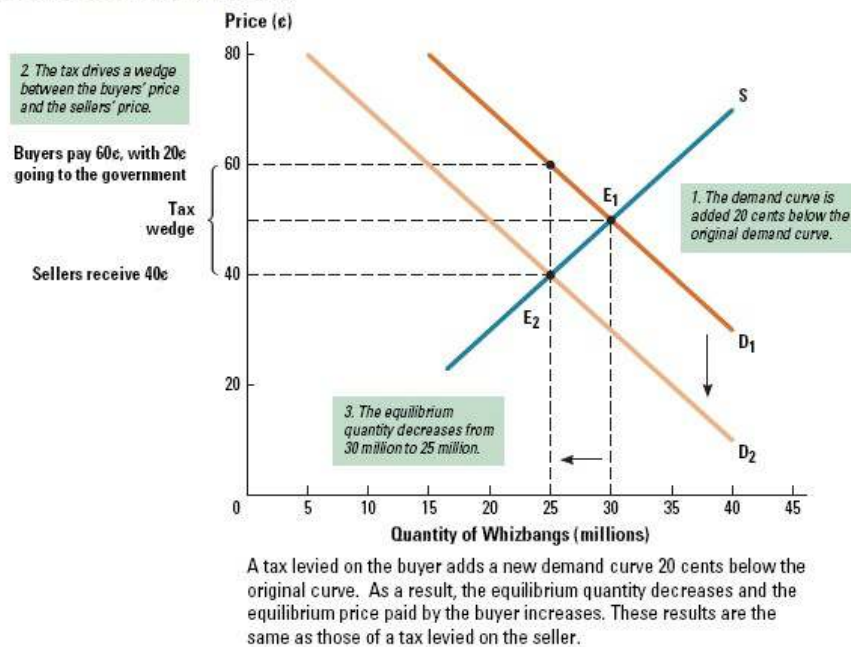


The revenue from a per-unit tax is the amount of the tax multiplied by the number of units sold at the post-tax equilibrium point. The amount of tax revenue directly corresponds to the surplus lost to consumers and producers. The trades that no longer happen under the tax represent deadweight loss.

Effect of a tax paid by the buyer

- The demand curve shifts down. (y-intercept changes)
- Taxes drives a wedge between the buyer's price and the seller's price.
- The equilibrium quantity decreases from 30 million to 25 million.

Effect of a tax paid by the buyer



Effects of a tax on buyers and sellers

- Regardless of whether a tax is imposed on buyers or sellers, there are

4 identical effects resulting from tax.

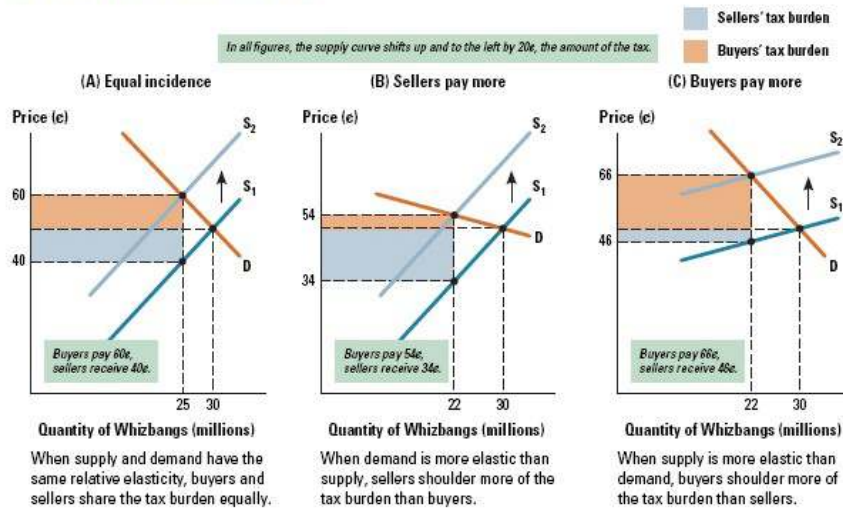
- Supply decreases when tax is on seller
- Demand stays the same when tax is on seller
- equilibrium price rises and quantities demanded falls when tax on sellers
- Demand decreases when tax is on buyers
- Supply stay the same when tax is on buyers
- equilibrium price and quantity demanded both fall when tax on buyers

Effect on surplus

- who bears the burden, or **tax incidence**, of a tax? -> depends on the relative elasticity of supply and demand curves
- tax incidence is equal to the loss in consumer and producer surplus going to tax revenue.
- Whichever side (supply or demand) of the market is **more price elastic (smaller slope: changes in price leads to more changes in quantities=more elastic)** will shoulder less of the burden (flexibility is good)

FIGURE 6-10

Tax incidence and relative elasticity



Subsidies

Two primary effects

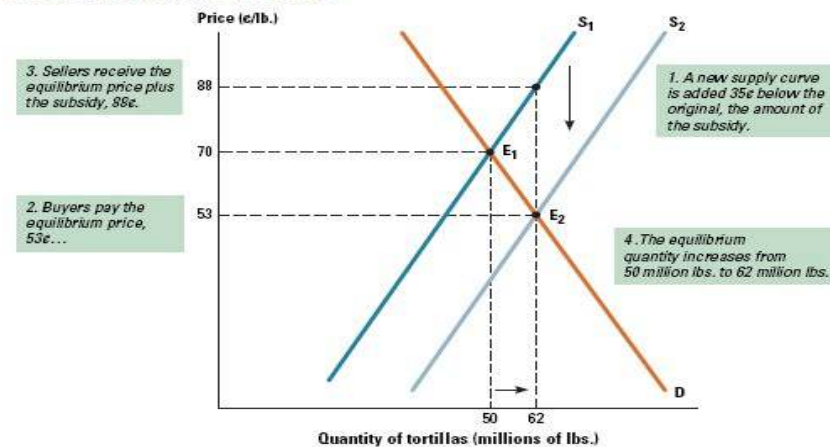
1. Encourages products and consumption of the good that is subsidized.
2. government provides money through subsidy.

Subsidies which the sellers receive

- The new supply curve subtracts the amount of the subsidy from all price. supply curves move downward (less price for the same quantity supplied).
- Subsidies on seller increases supply
- equilibrium price decreases and quantity demanded increases.
- no effect on demand curve

FIGURE 6-11

Effect of a subsidy to the seller



A subsidy has the opposite effect of a tax. A new supply curve is added 35 cents below the original supply curve. This decreases the equilibrium price and increases the equilibrium quantity supplied and demanded.

Increase in consumer surplus (CS)

CS after - CS before. (the area of the rectangle + the little triangle)

Increase in producer surplus

- PS after - PS before.

Cost of the subsidy

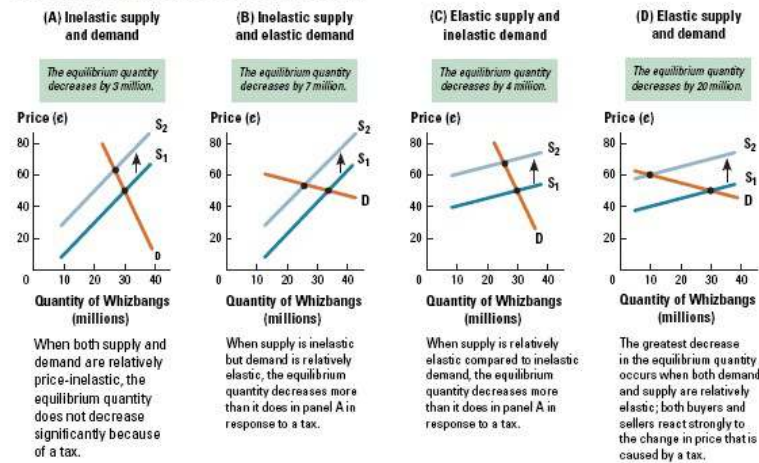
- government and taxpayers

DWL of subsidy

Effects of tax on sellers on quantity demanded

FIGURE 6-12

Price elasticity and the effect of a \$0.20 tax



Suppliers and demands are not sensitive to price of essential stuff.

(inelastic) Government can receive a lot of tax from imposing tax on these stuff.

- if people are sensitive, the government will not collect much tax

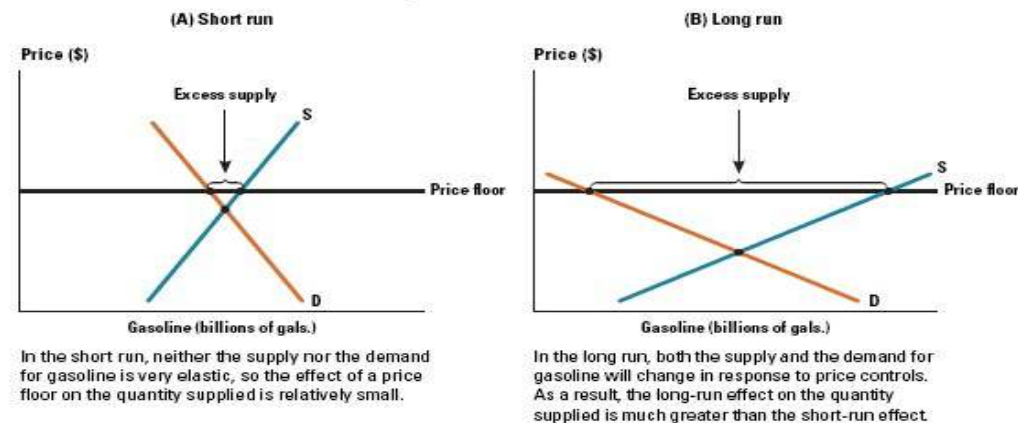
Long-run versus short-run impact

The effect of a government intervention may be lagged.

One example is gasoline, and price controls of gasoline.

FIGURE 6-13

Government intervention in the long and short run



- Both demand and supply becomes more elastic over the long run and the quantity demanded will change more than before.

Chapter 7: Consumer Behaviors

Utility basics

utility is a measure of the amount of satisfaction a person derives from something.

- incorporates emotions and sensations
- universal measure (yardstick) that allows individuals to compare choices
- not typically comparable across individual

Rational individual maximize utility when making choices.

Revealed preferences

- The idea that people's preferences can be determined by observing their behaviors
- utility is hard to measure.
- how can anything meaningful be said about the utility people experience? - observe what people actually do,

Utility function

- the principle of revealed preferences isn't feasible for analyzing how people make choices.
- utility functions aid in systematically analyzing choices.

A **utility function** is a formula for calculating the total utility that a particular person derives from consuming a combination of goods and services (called a **bundle** of commodity).

- utility functions **quantify preferences**
- utility measurements are **relative, not absolute**.

Marginal utility

- the change in total utility from consuming an additional unit of a good or service.
- the utility from the next unit is not as great as the last unit.

Diminishing marginal utility is the additional utility gained from consuming successive units of a good or service tends to be smaller than the utility gained from the previous unit or service.

The utility function and the marginal utility can be plotted. an individual maximizes utility when total utility is greatest or marginal utility is zero.

Maximizing utility with constraints

- People have many wants and are constrained by the time and money available to them.
- Rational individuals maximize utility within those constraints by spending their resources on the bundle that yields the highest possible total utility.
- A **budget** constraint provides all possible combinations of good and services a consumer can buy for a given income.

Indifference curves

- Indifference curve is a curve showing all the different bundles that provide a consumer with **equal** levels of utility. consumer is indifferent about different bundles
- higher indifference curve represents greater utility.
- usually slope downward and curve inward

Marginal rate of substitution (MRS):

- the rate at which a consumer is willing to trade or substitute between 2 goods.
- As long as the MRS is different than relative price, one can change the combination of her bundle and increase her utility.
- The optimal choice is at a point where the ratio of substitutions are the same for the consumer and the market.

optimal choice : the substitution rate is the same as the slope of budget line.

Responding to changes in income

- When a person's income increases, more budgets for choices.
budget line shifts outward
- **income effect**: the change in consumption that results from increased effective wealth due to lower prices.
budget line rotates because price of one good changes
- Substitution effect: the change in consumption that results from a change in the relative price of goods substitute a good that has become cheaper in relative terms for the one that has become more expensive. or i.e. the opportunity cost of one good changes.
-
- A price change causes the budget line to **rotate. (different slope)**
- substitution effect dominates the income effect.
- At the **optimal consumption** bundle, the slope of the budget line is the same as the slope of the indifference curve.

Chapter 8: Behavioral Economics

behavioral economic

- a field of economics that draws on insights form psychology to expand models of individual decision making.
- studies why individuals appear to act irrationally by studying insight from psychology.

Procrastination: carrying out less urgent tasks in preference to more urgent ones.

The conflict between plans and actions can be better understood using some closely related theories such as:

time inconsistency

when we change our minds about what e want simply because of the timing of decision.

individual can hold 2 inconsistent sets of preference

- what we would like to want in the future
- what we will want in the future, when the future comes.

we are time inconsistent when we say we want apple next week, but wants to switch to cake when next week came.

Competing selves

future-oriented self: clear sighted preference to get things done

present-oriented self: blackslides when faced with alternative choices now

Commitment

commitment devices: an arrangement entered into by an individual with the aim of helping fulfill a plan for future behavior that would otherwise be difficult.

helps alleviate competing selves and procrastination

- example: future oriented self knows that he cannot trust his present-oriented self to resist temptation, so he evenly space out time for his assignments instead of doing everything last min before the deadline.

Thinking irrationally about costs which leads to irrational decisions

Sunk cost fallacy

ex. sit through the end of a terrible movie just because u don't want to waste the cost of movie ticket.

sunk cost: a cost that has already been incurred and cannot be refunded or recovered.

Undervaluing opportunity cost

- sometimes the alternative is not really apparent and opportunity cost is not obvious, such as time
sitting through a movie and fail to recognize the opportunity cost of their time.
- **implicit cost of ownership**
people value things more once they possess them

Forgetting about fungibility

- **Fungible** - easily exchangeable or substitutable
- separating money into mental categories help individuals commit to buying what they thought was right during categorization
create mental categories for money
- money for vacation and money for normal expenses.
- money is fungible and easily interchangeable.
- forgetting that money is fungible can also make individuals riskier.
gamblers play riskier when they win.

Chapter 9: Game Theory and Strategies

Games and Strategic behavior

- People behave rationally when they look at the trade-offs they face and pursue their goals in the most effective way possible.

Game Theory studies how people behave strategically under different circumstances

Game: a situation involving at least 2 people that requires those involved to think strategically

Behave strategically

acting to achieve a goal by anticipating the interplay between your own and other's decision

Rules, strategies, and payoffs

All games share 3 features: rules, strategies, and payoffs.

Rule define the action that are allowed in a game

Strategies are the plans of action that players follow to achieve their goals.

payoffs are the rewards that come from particular action.

The Prisoners' dilemma

- a game of strategy in which 2 people make rational choices that lead to a less-than-ideal result for both.
- The prisoner's dilemma is a one-time game of strategy in which 2 people in isolation make the choice to "confess" or "don't confess" that together they committed a crime. The payoff matrix is as follows:

Dominant Strategy

Dominant Strategy: is the strategy that is the best one for a player to follow (best response) no matter what strategy the other players choose.

if choices differ depending on the choice of other person, there is no dominant strategy.

Ask 2 questions

1. what should I do if the other player choose to confess?
2. what should i do if the other player choose not to confess?

If the answer for these 2 questions are the same, that is the best strategy.

The Prisoners' dilemma

- The solution to the game is called **a Nash equilibrium** (Named after John Nash) when all players choose the best strategy they can, given the choices of all other players.
- In other words, a cell in the payoff matrix is a Nash equilibrium if no one will change his/her choice, given the others stay with their choice.

Nash equilibrium

How to find Nash equilibrium (some preliminary rules)

- If both players have dominant strategy, they will play it and equilibrium is these strategies.
- If one player has dominant strategy and the other player does not have a dominant

strategy, it is still possible to have equilibrium because one player plays her dominant strategy and the other one can respond accordingly.

While dominant strategies can sometimes solve for the Nash equilibrium, sometimes games do not have an equilibrium.

Reaching equilibrium

- The Nash equilibrium is sometimes referred to as the **non-cooperative equilibrium**
- This is because players act independently, only pursuing their individual interest.

Promoting competition in the public interest

While cooperation may serve the best interests of the players directly involved, it may have societal consequences.

repeat play in the prisoners' dilemma

Repeated games

- a game that is played more than once.
- players no longer need commitment strategies to reach a mutually beneficial equilibrium

Commitment strategies:

an agreement to submit to a penalty in the future for defecting from a given strategy.

The cooperative equilibrium is more likely to occur because simple commitment mechanisms exist.

tit-for-tat: a strategy in which a player in a repeated game takes the same action that his or her opponent did in the previous round.

Sequential games

- in all of the previously discussed games, both players moved simultaneously.
- In many instances, an individual or company must move prior to other participants choosing an choice.
- A decision tree visualizes sequential games.

Backward induction

- the process of analyzing a problem in refer, starting with the last choice, then the second-to-last choice, and so on, to determine the optimal strategy.

First mover advantage

- benefit enjoyed by the player who chooses first and as a result gets a higher payoff than those who follow.

Chapter 10: Informaiton

Information: knowledge is power

- Many times in economic analyses it is assumed that individuals are fully informed (**complete information**)
- rarely do individual have perfectly complete information
- often they have sufficient information to make acceptable choices

Information asymmetry

- When one person knows more than the other during an agreement, information asymmetry occurs.
- When one person knows much more than the other, that person can achieve what he wants at the other's expense:
- This occurs only because both parties' incentives are not aligned.
- If both parties incentives are aligned, then information asymmetries do not matter.

2 important types of *information asymmetry* are:

Adverse selection: Occurs prior to completing an agreement when buyers and sellers have different information about the quality of a good or the riskiness of a situation, results in failure to complete transactions that would have been possible if both sides had the same information:

- related to **unobserved characteristics of people and goods**
- An example of adverse selection is the **lemons problem in the used-car market** used car sellers know more about the characteristics of their cars than potential buyers. buyers of used car are aware that they do not have the same information a the seller.

used car sellers that provide high quality cars are underpaid.

How is adversive selection combatted in the used car market?

carfax report on car's history

seller's reputation

used car warranties

car inspection from a mechani

Moral Hazard: the tendency for people to behave in a riskier way or to **renege (betray) on contracts** when they do not face the full consequences of their actions after an agreement has been made:

- relates to actions of those involved in the agreement.
- asymmetric information after agreement: moral hazard
- one person face the full consequences of the actions
example: **Principal-agent problem**
Employers (principal) make an agreement with employees (agents) to do a set of tasks.
Employees have an incentive to not work as hard as they can
Employers may find it costly to monitor employee's efforts
- Combating moral hazard
monitoring work effort

profit-sharing component to wages
give housing selling agent 3% of house selling price or give 20% of extra profit if they did a good job in selling.
flat-fee for a set tasks

Solving information problem

- **Screening:** reveals private information
- **Signaling:** taking action to reveal one's own private information (use warrant to signal potential buyers that my cars are better)
- **reputation:** if interactions occur multiple times, parties can use their past history to indicate that the other party has full information
- **Statistical discrimination:** distinguishing between choices by generalizing based on observable characteristics in order to fill in missing information choosing from difference movies based on which type of movie i typically like best.
- **regulation:** the government requires information disclosure or requires participation in a market. (nutrient labels, side effects of medication. etc)

Chapter 12: The Cost of Production

Producer theory

- firms intend to maximize their economic profit
- firms make decisions on how much of a good to produce
- Like any other choice, this involves cost-benefit analysis
- Benefit for a firm is **revenue**.

Revenues, costs and profits

A firm's goal is to maximize profits:

Profit = Total revenue - Total cost

- Total revenue is the amount that a firm receive from the sale of goods and service and is calculated as the quantity sold multiplied by the price paid for each unit:

Total revenue = quantity x value per unit

Fixed and variable costs

- A firm's total cost is defined as

Total cost = fixed cost + variable costs

- fixed costs are costs that do not depend on the quantity of output produced
- One-time, upfront payments before production begins, like buying equipment
- ongoing payments, like month rents
- Fixed costs are constant as quantity increases.
- even if a firm produces nothing, it still incurs a fixed cost.

Variable costs

- are those that depend on the quantity of output produced.
- includes raw materials as well as labor costs
- Total variable costs increase with each additional unit produced.
- **If a firm produces nothing, variable costs are zero.**

Explicit and implicit costs

- to properly accounts for the total costs incurred by a firm, total cost includes both types of costs.
- Economics is about choices. Both types of costs are involved in making choices.
- **Explicit cost:** cost that require firms to spend money
- **Implicit cost:** costs that represent foregone opportunities. opportunities that could have generated revenue if the firm had invested its reuses in another way.

Accounting profit

- When companies report their profits, they provide accounting profits

Accounting profit = total revenue - explicit costs

- To account for implicit costs, economic profit further subtracts implicit costs

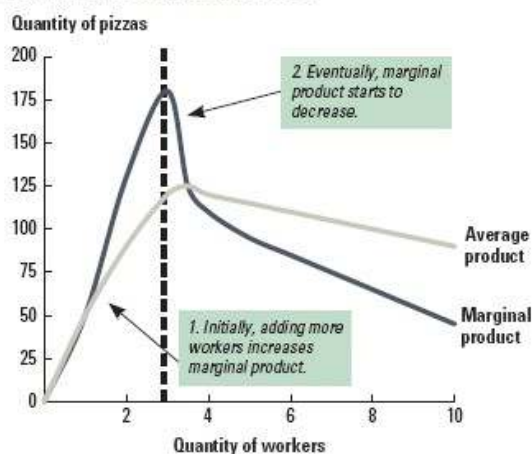
Economic profit = accounting profit - implicit costs = total revenue - (explicit cost + implicit cost)

Production

- A **production function** is the relationship between the quantity of inputs and the resulting quantity of outputs.
- The increase in output that is generated by an additional unit of input is the **marginal product**.
- The **principle of diminishing marginal product** states that the marginal product of an input decreases as the quantity of the input increases.
- The average product is total production (output) divided by the number of workers (input).

FIGURE 12-3

Average and marginal product



As the first few workers are added, marginal product increases. As the quantity of workers continues to increase, however, the principle of diminishing marginal product kicks in. When the marginal product curve crosses the average product curve, average product also starts to decrease.

Average and marginal product

Mar > Ave --- Ave increases

Mar < Ave --- Ave decreases

Cost of production

- Marginal cost is needed to study optimal choices
- Average costs are needed to study the structure of firms and the profit/loss

Ave. fixed cost (AFC) = fixed cost / quantity of output

Ave. variable cost (AVC) = variable cost / quantity of output

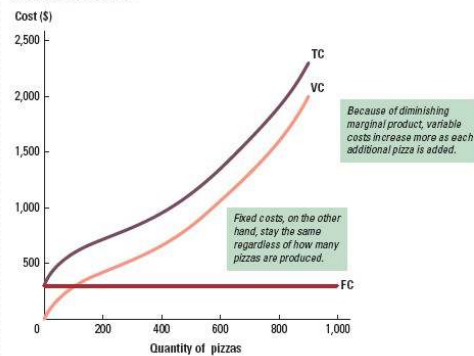
Ave. total cost (ATC) = total costs/ quantity = AFC+AVC

Marginal cost (MC) = change in total cost/ change in quantity of output

Cost curves

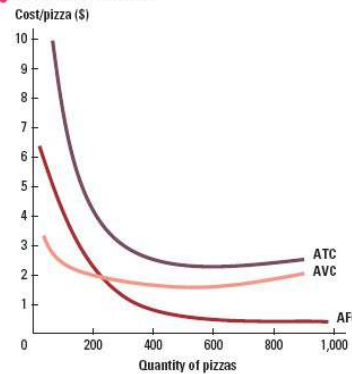
FIGURE 12-4

The total cost curve



The increasing slope of the total cost curve reflects the principle of diminishing marginal product: Each additional worker costs the same as the previous worker, but adds fewer additional pizzas to production. Fixed costs, of course, stay the same regardless of how many pizzas are produced. The total cost curve is the sum of variable and fixed costs.

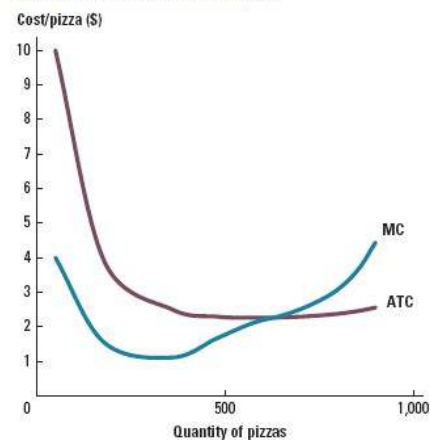
Average cost curves



This figure shows the key features of average cost curves. Average fixed cost (the red line) always decreases as output increases, because the same cost is spread out over more units of output. Average variable cost (the pink line) at first decreases and then increases, reflecting the marginal product of inputs. Average total cost (the purple line) is simply what you get when you add these two together. It's also U-shaped as the increases in average variable cost are weighed against the decreases in average fixed cost.

FIGURE 12-7

Marginal and average cost curves



Marginal cost crosses the average cost at the **minimum point** of average total cost if the MC of increasing production by one unit is less than current average total cost, then producing that extra unit will decrease your average total cost. If on the other hand, the MC of increasing production by 1 unit is more than current ATC, then ATC increases.

It is a mathematical relationship.

Costs in the long run

- Costs that are fixed may be adjusted in the long-run.
- - of example, factory sizes can be adjusted to increase or decrease capacity.
- In the short-run, at least one fixed input cannot be adjusted.
- The long-run is the time required for a firm to vary all of its costs, is so desired.
- - the long-run depends on firm and production types.
- The cost curves considered so far are short run cost curves.
- When a firm adjust one of its long-run costs, the entire fixed cost curve shifts, as it is more efficient .

Returns to scale

6. describes the relationship between the quantity of output and average total cost.

Economies of scale

4. returns that occur when an increase in the quantity of output decreases average cost.

Diseconomies of scale

- returns that occur when an increase in the quantity of output increases average cost.

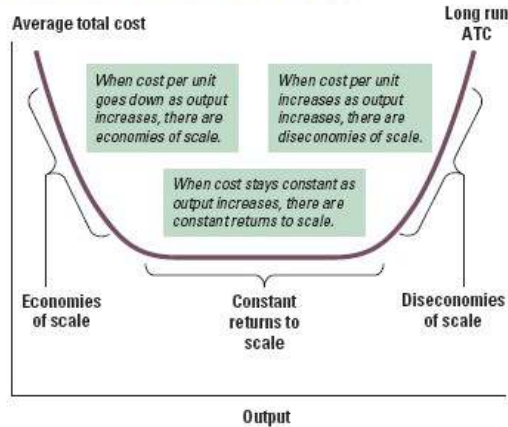
Constant returns to scale

3. returns that occur when average total cost does not depend on quantity of output.

- cost stay constant when quantity of output increases.

FIGURE 12-8

Economies and diseconomies of scale



When a firm could achieve economies of scale by expanding, its long-run ATC curve slopes down, showing decreasing ATC as output increases. When it would face diseconomies of scale by expanding, the curve slopes up, showing rising ATC as output increases. The long-run ATC curve is flat in the middle, representing the various levels of output at which the firm achieves constant returns to scale.

An industry experiencing constant returns to scale is just the right size because it has grown large enough that it has exhausted any and all economies of scale that it could gain by expanding, but it has not expanded so much as to create any diseconomies of scale. An industry experiencing constant returns to scale will not decrease average total costs by either expanding or shrinking. Note that being small enough to be manageable is not an economic concern, nor is there anything suggesting that marginal cost would not be positive.

Efficient scale

- the quantity of output at which average total cost is minimized.

Chapter 13: Perfect Competition

A competitive market

- analyzes how firms make production decisions in a competitive market.
- The characteristics of a **competitive markets** are:
 - buyers and sellers are price takers.
 - the good or service is standardized.
 - firms freely enter and exit the market
 - full information exists.

Competitive markets have so much competition that no one has the ability to affect market prices. thus all are **price takers**.

If a buyer or seller has the ability to noticeably affect market prices, that person/firms has **market power**.

Perfectly Competitive Firm's Demand

- A firm's demand curve in a perfectly competitive market is a horizontal line (demand is the same as price).
- The firm takes the price from the market(i.e. price is constant, no matter how many units it produces).

Revenues in a perfectly competitive market

In a perfectly competitive market, producers are able to sell as much as they want without affecting the market price.

Profits and production decision

- Firms seek to maximize profits
- In a competitive market, the only choice that a price-taking firm can make to affect profits is the quantity of output to produce.
- The profit-maximizing quantity corresponds to the quantity at which **marginal revenue (MR) is equal to marginal cost(MC)**.

Profit maximization occurs when $MR = MC$

Average revenue = $(P \times Q)/Q = P$ (Price)

Average revenue = Price

Marginal revenue = revenue generated by selling an additional unit of a good.

since it is a competitive market, $1 \times P = P$.

Price = MR (Marginal Revenue)

$$P = MR = AR$$

How much to produce?

- A firm should continue to produce as long as MC is less than MR, it should stop as soon as the 2 are equal.
- The **profit-maximizing quantity** is the one at which $MR = MC$

socially optimal (competitive) price: $P = MC$

Deciding when to operate

When deciding the quantity to produce, a firm additionally must decide whether to

1. produce
2. shut down in the short run
3. exit the market in the long run

Firm's decision: profits and losses

3 possible cases:

1. revenue per unit (=price) is more than total cost per unit (ATC):

$$P > AFC + AVC$$

Firm makes profit, keeps producing

- revenue per unit (=price) is less than total cost per unit (ATC) but more than variable cost per unit (AVC): firm loses money

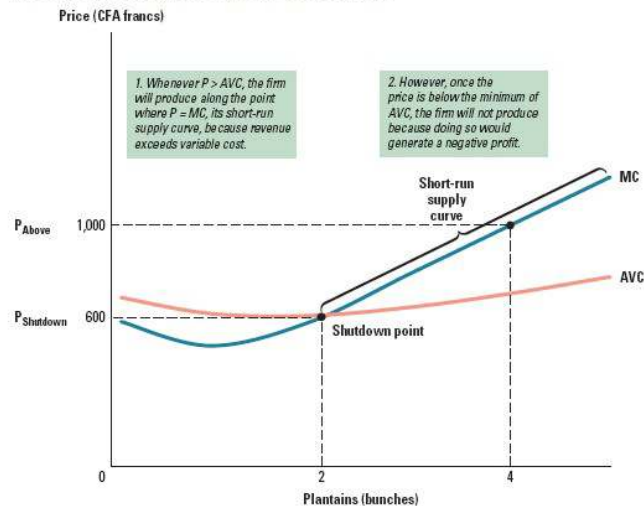
$$P < AFC + AVC$$

The short-run supply curve and the shutdown rule

- The short run shutdown rule is to produce if price is higher than AVC. ($P > AVC$)
- shut down when $P < AVC$
- $ATC > P > AVC$ ---> shouldn't shut down

FIGURE 13-2

The short-run supply curve and the shutdown rule



The section of the marginal cost curve that is above AVC describes the firm's short-run supply curve. At any price above that point, the firm will produce the quantity where price intersects the MC curve. At prices below the minimum of AVC, the firm produces nothing, because it would generate a negative profit.

Long run decision

- The key difference between short and long run supply is that firms are about to enter and exit the market in the long run
- all costs become variable
- exit when $P < ATC$

if $P > ATC$

- existing firms can earn economic profit
- positive economic profit attracts new firms (entry is new)
- the market supply curves shifts outward
- Market price decreases
- Economic price decreases.
- This process will continue until there is not economic profit

long run point

- in the long run, there is no profit or loss. it has to be at the point $P = ATC$
- the rule of optimal choice is $MC = MR$
- MC crosses ATC at the minimum point of ATC
- in the long run, $P = \min(ATC) = MR = MC$

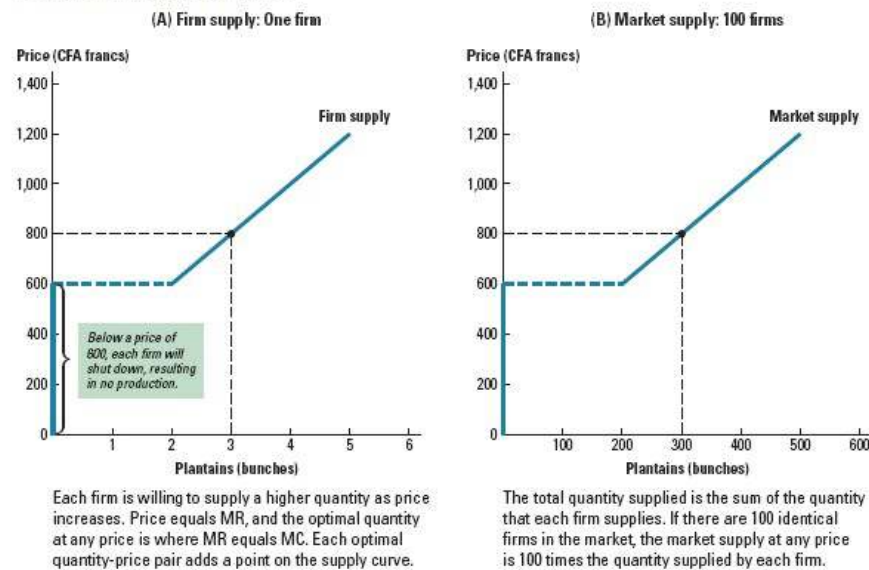
- competition forces production at the minimum cost. most efficient

supply curves

- The firm's supply curve is its marginal cost.
- The market supply curve is the sum of each firm's supply curve.

FIGURE 13-4

Firm and market supply curves



Long run economic profits

Market entry due to changing production costs

- Improved technology and production capabilities lowers MC and ATC.

Non-competitive market

- No firm in competitive market can charge a price above its marginal cost.
- Firms in non-competitive market can charge a price marginal cost. $P > MC$

Chapter 14: Monopoly

Why do monopolies exist?

A **monopoly** refers to a firm that is the **only producer** of a good or service with no close substitutes.

- A firm is a perfect monopoly if **it controls the entire market**.
- A firm has monopoly power if **it can manipulate the price**.

Monopolies exist because of **barriers to entry** that prevent other firms from entering the market.

A **natural monopoly** refers to a market where a single firm can produce the entire market quantity demanded at a lower cost than multiple firms.

Monopolists and the demand curve

- Monopoly markets differ from perfectly competitive markets with regard to their demand curves.
- In perfectly competitive firms' demand curve is horizontal, meaning that if price changes, there is no demand. Firms cannot affect the market price with regard to their production decisions.
- Monopolists face a downward sloping demand curve.

Monopoly revenue

- When a monopolist produces more of a good, the market price is driven down.
- Therefore, producing an additional unit of output has 2 effects on total revenue.
 1. **quantity effect**: total revenue increases as more units are sold
 2. **price effect**: total revenue decreases as price for each unit decreases.
- Because of decrease in price when quantity increases, marginal
- The total revenue (TR) maximizing point is identified where $MR = 0$.
- If demand is linear, marginal revenue (MR) decreases twice as fast as demand line.
- MR is not equal to price.
- $P > MR$
- $AR = \text{Price}$ is the same as demand curve

Monopoly profit-maximizing quantity

- While revenue is important, firms maximize profits.
- The **profit-maximizing quantity** of output for a monopoly is found where marginal revenue equals marginal cost. $MC = MR$
- then set the price base on the demand for that quantity.

Monopolistic market

The profit maximizing point in a monopolistic market is the defined by combining the optimizing

Market Power: $P > MC$

socially optimal level: $P = MC$

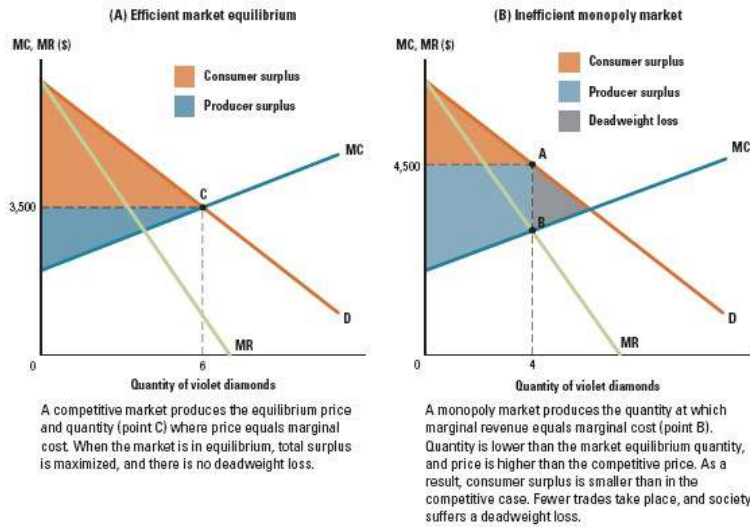
Problems with monopoly

- Monopoly charges a price above socially optimal price (MC)
- Monopoly produces at less than socially optimal level (when MC (supply) meets demand curve at **socially optimal level**)
- There will be dead weight loss.

The welfare costs of monopoly

FIGURE 14-5

Deadweight loss in a monopoly market

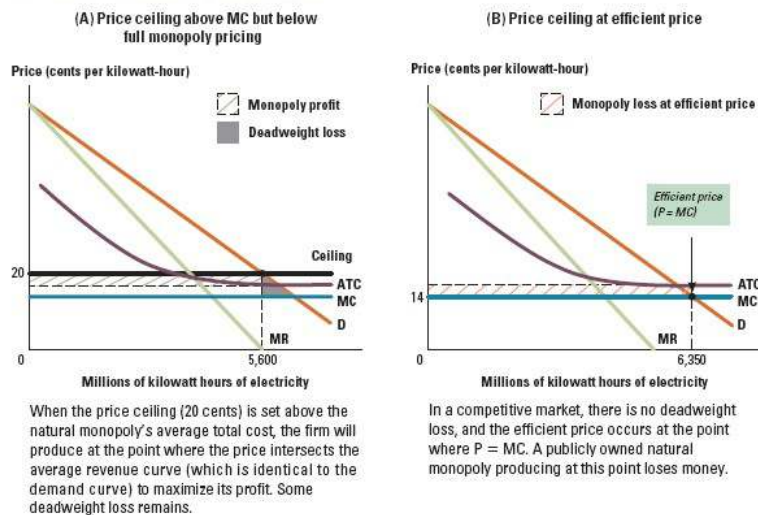


Natural monopoly

- Very large FC
- Small, usually constant AVC (so, $AVC = MC$)
- ATC is decreasing for the entire demand in the market (economies of scale exists).
- It is less costly if we let only one supplier to supply.

FIGURE 14-6

Price regulation of a natural monopoly



Public Policy Responses

- We try to manage monopolies to reduce the harms
- Policy responses are often imperfect and controversial
- The goals of policy responses are typically: breaking up existing monopolies (**horizontal split**)
- Prevent new monopolies from forming
- Ease the effect of monopoly power on consumers

Public policy responses: Antitrust law

- One public policy response is to enact antitrust laws that investigate and prosecute corporations that engage in anti-competitive practices.
- Sherman Antitrust Act of 1890
- Clayton Antitrust Act of 1914
- Critics of antitrust laws argue that they: are typically politically motivated, cause more inefficiency than they create.

Public policy responses: public ownership

- One public policy response to natural monopolies is to allow the government to run them.
- Ex. US postal service

Benefits

Provide broader services

set prices lower than unregulated monopolies.

costs

political pressure

loss of profit incentive potentially leading to inefficiencies.

Public policy responses: regulation

- if policy makers do not want public ownership, one common intermediate step is to regulate the behavior of natural monopolies
- takes the form of price control.
- price regulated to *socially optimal level* which is marginal cost ($P=MC$)
- monopoly is producing at a loss because $P < ATC$
- No deadweight loss at competitive market price.
- price ceiling set above the monopolist's ATC can resolve this problem
- but there is DWL
- more over, firms have incentive to operate at high cost (or to avoid releasing true costs. They overstate the costs).
- Sometimes we set the price exactly at ATC ($P=ATC$)
- there is DWL
- firms make no profit, they don't have loss
- firms have incentive to overstate the cost.

Public policy responses: vertical split

introduce competition rather than splitting a monopolist "horizontally" into multiple companies that compete to sell the same product, a "vertical" split divide the original firm into companies that operate at different points in the production process.

Market power and price discrimination

- Some consumers are willing to pay more for a good than the prevailing market price.
- Price discrimination is the practice of charging customers different prices for the same good.
- Firms with monopoly power can charge higher for ppl with higher willingness to pay for a good.

Ex. Microsoft Office

Perfect Price discrimination

- Set price equal to each customer's willingness to pay.

imperfect price discrimination

- sets price per each group of customers

Chapter 15: Monopolistic Competition and oligopoly

- **monopolistic competition** describes a market with many firms that sell similar, but differentiated, goods and services.
- able to earn a positive profit in the short run by selling a differentiated product.
- firms have an interest in **persuading** customers that their products are unique, a practice known as **product differentiation**.

Oligopoly

- a market with a **few firms** selling a similar good or service.
- **Strategic interactions** between a firm and its rivals have a major impact on its success.
- An individual firm's price and quantity affect others' profitability
- we use **game theory** to study this market.
- Existence of some barrier to entry.

perfectly competition: no market power

Monopoly: full market power

monopolistic competition: some market power

- Monopolistic like monopoly operate at smaller-than-efficient scale

Monopolistic competition in the short run

Monopolistically competitive firms behave like a monopolist in the short run.

downward-sloping demand curve

U-shaped ATC curve

produce where $MR = MC$

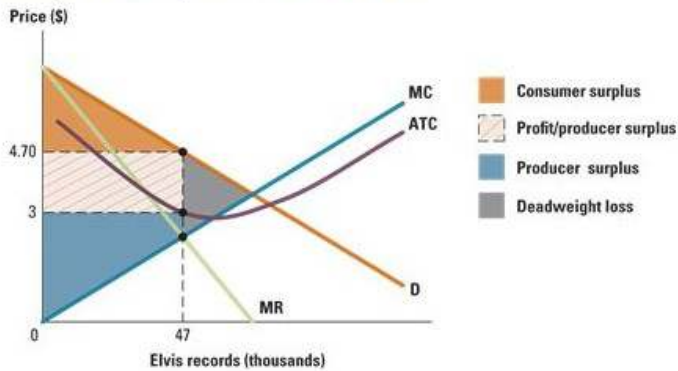
charge corresponding price on demand curve

firm can earn profits by extracting consumer surplus

create deadweight loss.

FIGURE 15-2

Monopolistic competition in the short run



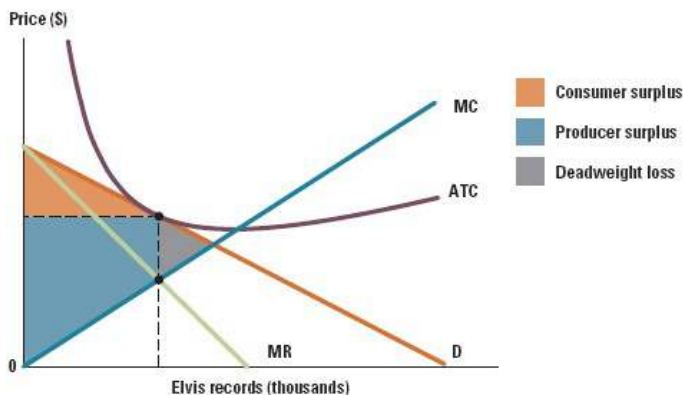
In the short run in a monopolistically competitive market, Elvis's label will produce records up to the point where marginal revenue is equal to marginal cost, and charge the corresponding price on the demand curve. The firm earns profits in this case, but also creates deadweight loss.

Monopolistic competition in the long run

- In the long-run, firms can enter and exit the monopolistically competitive market.
- Enter: existing firm's demand curve shifts to the left (positive economic profit)
- Exit: existing firm's demand curves shifts to right. (negative economic profit)
- there is no economic profit in the long run
- ATC is tangent to the demand curve

FIGURE 15-3

Monopolistic competition in the long run



In the long run in a monopolistically competitive market, firms will enter the market, driving down demand until all market participants earn zero economic profits. Elvis's label will produce records up to the point where marginal cost equals marginal revenue. Because profits are zero, this is the same as the quantity at which average total cost curve is tangent to the demand curve.

The welfare costs of monopolistic competition

Monopolistically competitive firms are inefficient

- firms maximize profits at a $P > MC$
- quantity is reduced
- deadweight loss occurs and the market does not maximize total surplus.

Regulation to increase efficiency is difficult

- regulating a lower price would mean that those firms that could not produce at a lower cost would be forced to leave the market.

Product differentiation, advertising, and branding

- Product differentiation enables firms to maintain economic profits in the short run.
- firms have incentives to persuade customers that their products cannot easily be substituted.
- **Advertisement:** Valuable if expanding information, though it generally appeals to image over reality.
- **Branding:** Valuable when it signals a hard-earned reputation, though it may perpetuate false perceptions of product differences that represent barriers to enter: (starbucks everywhere).

Advertising as a signal of quality

- Advertising may be a signal of quality in itself, as it is costly to advertise.
- For example, music companies typically only promote "good" albums

Oligopoly

- A firm in an oligopoly market competes against a few identifiable rivals with market power.
- One firm's profit depends not only on its decisions, but also on the other firm's decision (game theory again!)
- There is interdependency
- Oligopolists make strategic decisions about price and quantity that take into account the expected choices of their competitors
- Game theory can be applied.

Oligopolies: Collusion or competition

- Supposed there are 2 big music labels selling a standardized good - an album
- - each firm has fixed cost of \$100 million
- - each firm has marginal costs of \$0

Collusion: if they cooperated and acted like joint monopolists, they would produce quantities where total profit is maximized ($MC=MR$)

Competition: if they acted like perfectly competitive firms, they would produce at the quantity where $P=MC$

- Each firm has an incentive to gain higher profits by increasing quantities

produced at the cost of lower price.

Compete or collude?

- Is there a dominate strategy for a player?
- use the prisoner's dilemma
- In oligopoly markets, competing is a dominant strategy for both firms
- Since all firms in this game have a dominant strategy, the result is a Nash equilibrium, an equilibrium in which each party chooses an action that is optimal given the choices of rivals.
- This strategy often holds firms together in a **cartel**.
- A **cartel** is a group of firms who collude and talk about price and quantity

Oligopoly production as the prisoners' dilemma Record labels' decision to collude can be modeled as a game called the prisoners' dilemma. Although both firms would be better off if they could agree to collude and produce a lower quantity, each has an incentive to defect from this agreement and earn more profits.

		Universal Music Group	
		Collude Produce 35m CDs	Compete Produce 45m CDs
Warner Music	Collude Produce 35m CDs	Profit: \$390m $Q = 70m$ $P = \$14$ Profit: \$390m	Profit: \$440m $Q = 80m$ $P = \$12$ Profit: \$320m
	Compete Produce 45m CDs	Profit: \$320m $Q = 80m$ $P = \$12$ Profit: \$440m	Profit: \$350m $Q = 90m$ $P = \$10$ Profit: \$350m

But what if Warner also decides to produce 45 million albums? Reading across the bottom row, we see that if Universal makes 35 million albums it will make \$320 million; if it produces 45 million albums it will make \$350 million. Again, the choice is clear. Looking at his options, the CEO of Universal will conclude that whatever Warner decides to do, Universal should produce 45 million albums.

- Producer maximize profit by producing where $MR = MC$ in all 3 types of market.
- The **efficient** outcome is to produce where $P=MC$ in all 3 types of markets
- The **efficient** outcome is achieved in perfectly competitive markets only
- Market price is greater than marginal revenue (MR) in monopoly markets and oligopoly market only. ($P > MR$)
- Some form of barriers to entry exist in monopoly markets and oligopoly market only.
- If they collude, oligopolies will produce the same level as monopolies. (A colluding duopoly has the same outcome as a monopoly)
- The less differentiated products are, the more difficult it is to sustain inefficient prices and the smaller the deadweight loss.

Chapter 16: Factors of Production

The ingredients that go into making a good or service are called factors of production.

- - land
- - labor
- - capital (manufactured goods that are used to produce new goods)
- factors of production are bought and sold in markets, in much the same way as the good they go into producing.
- The price of each factor is determined by **supply and demand**.
- Supply of factors of production comes from households(labors).
- demand for factors of production comes from producer.
- - demand for factors of production is referred to as derived demand.

Production

- Production require using factors of production
- in some cases, firms can choose what combination of factors to use, substituting one for another, in other cases, they cannot.
- ex. farmer can choose to pick tomatoes by using many workers and no machinery, or few workers and more machinery.
- a baseball team cannot choose to reduce the number of players and increase the number of baseball bats.

More production is possible by using more factors of production (production function is increasing).

Picking the right combination of inputs

- profit-seeking firms choose the combination of inputs that maximizes profit, based on the local price of factors of production.
- Prices of farm machinery are similar across the world, labor costs vary
 1. poor economies: cheaper labor, leading to more workers and fewer machines
 2. rich countries: more expensive labor, leading to fewer workers and more machines.

Marginal productivity

- The amount of each factor of production purchased depends on marginal product of what factor (how much each factor contributes to the value of the end product)
- **The marginal product is the increase in output that is generated by an additional unit of input.**

marginal product is equal to the slope of the total production curve.

Diminishing marginal productivity

more factor of production, decreases marginal production

Labor markets and wages

- The markets for factors of production can be studied using supply and demand.
- Individuals who work are the **suppliers** of production.

Demand for labor: marginal product

- The more workers a farm employs, the more tomatoes the farm can harvest.
- Each additional worker adds fewer tomatoes to the harvest than the previous one.

Demand: how many workers to hire?

Choice: $MC=MB$ (marginal benefit = MR)

- Firms maximize profit by hiring workers up to the point at which the revenue generated by the last worker (Marginal revenue) equal the additional cost of that worker (Marginal cost/wage)
- The benefit of hiring a worker is value of the marginal product (**$MR=VMP$**) which is the marginal product generated by an additional unit of input times the price of the output (**$VMP = P \times MP$**)
- The demand for labor is easily identified when the value of marginal product (VMP) equals wage (i.e. adding another labor does not add anything to profit)
- If the wage increases, firms' optimal decision would be to hire less workers.
Downward sloping demand for labor.

Determinants of labor demand and supply

- Quantity demand decreases by wage (increases wage, quantity demand decreases)
- Demand is determined by the value of the marginal product of labor.
any event that changes the value of the marginal product changes demand.
- 2 major determinants of demand are: **Technology (increase MP), Output prices (Increases the VMP)**, the third is the supply of other factors.

Supply of labor

The supply of labor is more complicated than the supply of most goods, but it is still driven by a basic trade-off between the costs and benefits of supplying labor to firms:

work more, earn more money, and have less time off.

work less, earn less money, and have more time off.

- Economists categorize non-work activities as **leisure**.
- The decision of whether to supply another hour of labor depends on the trade-off between benefit (wage and other perks) and opportunity cost (lost time for leisure or other work)
- the indifference curves (based on preferences) allows us to find the balance (best combination of) between leisure and work hours
- While higher wages generally increase the quantity of labor supplied, this is not always true
- A higher wage increases the benefit of an additional hour of work, but it also, less obviously, increases the opportunity costs of working.
- If wage increases, opportunity cost of leisure increases.
- there are 2 opposing effects that determines whether the labor supplied increases or decreases

Price effect (PE): increase in labor supply in response to a higher wage.

Income effect (IE): decrease in labor supply due to greater demand for leisure caused by a higher income.

- When the price effect is less than the income effect, the labor supply curves is downward sloping.

Determinant of labor supply

- Supply is determined by the number of workers and the opportunity cost of providing their labor.

any event that changes the number of workers or the opportunity cost of labor changes supply.

- 3 major determinants of supply are: **Culture** (some culture working too hard is not appreciated), **Population** (increase population -increase supply) , **Other opportunities**.

Minimum Wage and efficiency wages

- supply and demand works
- There are 2 exceptions

minimum wage: price floor on the wage rate.

efficiency wage: a wage that is deliberately set above the market rate to increase worker productivity.

- both exceptions cause the market wage to rise above the equilibrium wage (surplus of labor occurs)
- The evidence is how minimum and efficiency wages affect world is mixed.

Company towns, Unions, and labor laws

- Labor markets are not always perfectly competitive.
 - There are 3 main reasons why labor markets are not perfect:
1. An employer can have substantial **market power**
 - A **monopsony** labor market is one in which there is only one buyer (employer) and many sellers (workers)
 - These firms push wages down
 2. Employees can have substantial market power through labor **unions** and collective bargaining.
 - A monopolist on labor
 - Workers push for higher wages
 3. **Government Intervention** can cause markets to move away from equilibrium

Major labor laws of the 20th cen.

- Regulations can also affect the labor market.

Shifts in labor supply and demand

- The supply and demand curves for labor can shift right or left with changes in **nonprice determinants**.
- Supposed that border enforcement cracks down on illegal farm workers. --> supply shift left (supply decreases).

Some facts about immigration to the US.

- The US has had more workers emigrating from other countries than any other economy in the world.

Changing demographics

Excessive population

- environmental effect
- investment in human capital
- number of mouths (babies) to feed

Declining population

- number of mouths (elderly) to feed
- production and innovation in crisis

Policies to encourage or discourage childbearing .

What is missing? Human capital (skills)

- There is not a single market with a single equilibrium for all labor in an economy.
- The labor market is a collection of many different interconnected labor markets for workers with similar skills.
- **Human capital** is the set of skills, knowledge, experience, and talent that determine the productivity of worker.
- The more similar the skills, the more connected the market.

Interconnected labor markets

- The skills required for farm laborer and hotel laborer are similar.
- If the demand for hotel workers increases, it affects both labor markets.
- --> An increase in the demand for hotels increases the demand for hotel workers
- --> the equilibrium points move up along the supply curve to a higher wage
- wage for farmer also increases as workers move to hotel and demand of farmer also increases

Equalizing labor markets

- The workers will move between **similar** industries until the wage is the same in these 2 industries.
- This does not happen between industries that require **different** skills

Land and capital

- There are 2 other main factors of production: **land and capital**
- A **capitalist** is someone who owns physical capital.
- When a firm wants to use land or capital, it has 2 choices - buy or rent
- The **rental price** is what producers pay to use a factor of production for a certain period or task. (Determined similarly to wages in a labor market (marginal productivity))
- The **purchase price** is what producers pay to gain permanent ownership of a factor of production (requires long run assessment)

Economic rent in rental markets for land and capital

- **Economic rent:** the gains that workers and owners of capital receive from supplying their labor or machinery in factor markets.
- similar to the concept of producer surplus, except the gains go to capital and land holders and workers.

The factor distribution of income

- The factor distribution of income is the pattern of income that people derive from various factors of production
- In the US:
 - the majority of income is derived from labor (about 70%)
 - corporate profit, interest, and rent all go to owners of physical capital and land.

Chapter 17: International Trade

Trade

Absolute advantage

Comparative advantage

The Roots of Comparative Advantage

"Invisible hand"

Incomplete comparative advantage

- trades are not free. it is a political issue. there are trade agreements.
- specialization is not complete within any country. some areas are better for production than others.

From autarky to free trade

- When an economy decides to engage in trade, the domestic price and quantity change.
- If the world price is less than autarky domestic price: domestic price decreases to equal the world price.

Producers export their goods and services when the world price is greater than the domestic price.

- If the world price is greater than autarky domestic price: domestic price increase to equal the world price, excess supply occurs

Big Economy, small economy

For many goods, the price goes down, and the country as a whole is better off, but producers lose out.

Restrictions on Trade

- The previous analysis indicates that imposing or lifting restrictions on trade can have different impacts on different groups of people.
- Laws limiting trade are referred to as trade protection
- **Protectionism** is a preference for policies that limit trade
- **Trade liberalization** is policies and actions that reduce trade restrictions.

Tariffs

- A tariff is a tax targeted at certain imports
- The purpose is to reduce the quantity of imports to protect domestic producers
- A tariff has 2 effects: Increases the world price for domestic consumers and decreases the amount of shortage made up by imports.

Effects:

- Tariff increases the world price for domestic consumer
- Consumer surplus decreases and producer surplus increases by imposing a tariff.
- Society loses some welfare due to tariff (dead weight loss).

Quota

- A **quota** is a **limit on the amount** of a particular good that can be imported.
- **Quota rents** are profits earned by foreign firms or governments under a quota.
- **Effects:** decreases imports, increases import price.
- The amount of import is restricted to 500 millions
- Producer and consumer surplus and DWL with quota.
-

International labor and capital

- As a rule of thumb, free trade increase demand for factors of production that are domestically abundant, and it increases the supply for factors that are domestically scarce
- causes factor prices to converge across countries
- owners of domestically scarce factors of production (e.g. labor in US) lose due to increased competition, and owners of domestically abundant factors (e.g. labor in China) gain from increased demand.

Friction in international trade

- Each country has its own set of laws and policies governing the economy
- safety policies
- labor standards
- environmental regulations
- taxes
- laws about corporate finance, and governance.

The WTO (organization made to make agreement possible), trade mediation

Embargoes: trade as foreign policy

- countries may use trade as a tool for foreign policy
- An embargo is a restriction or prohibition of trade in order to put political pressure on a country.
- Example:
- embargo on Cuba, society suffers

Chapter 18: Externalities

What is externalities?

- When individuals make calculated decisions, they weigh the costs and benefits of the actions
- **Private benefit** that accrues directly to the decision maker
- **Private cost** that falls directly on an economic decision maker
- Sometimes other people are affected by our decisions or have a stake in the

outcomes.

- **External cost** describes a cost imposed without compensation on someone other than the person who caused it (the third party).
- **External benefit** describes a benefit that accrues without compensation to someone other than the person who caused it (third party).

Private and social costs and benefits

- The total cost of a decision, the **social cost**, includes both private costs and external costs.
- The total benefit of a decision, the **social benefit**, includes both private benefits and external benefits.
- **External costs and external benefits are collectively referred to as externalities.**
- **Negative externality** = external costs
- **Positive externality** = external benefits.

Example of externalities

- driving your car (negative)

Modeling negative externality from the demand side

- Gas consumption imposes an external cost of \$1 on society.
- If the demander considers this cost, the demand curve will be lower. (shift to the left)
- Socially optimal level of consumption is less than before.
- if we eliminate external effect, we look at the private demand curve
- story is similar for the supply curves
- a negative externality always reduced surplus unless it is internalized

FIGURE 18-1

Internalizing a negative externality reduces demand

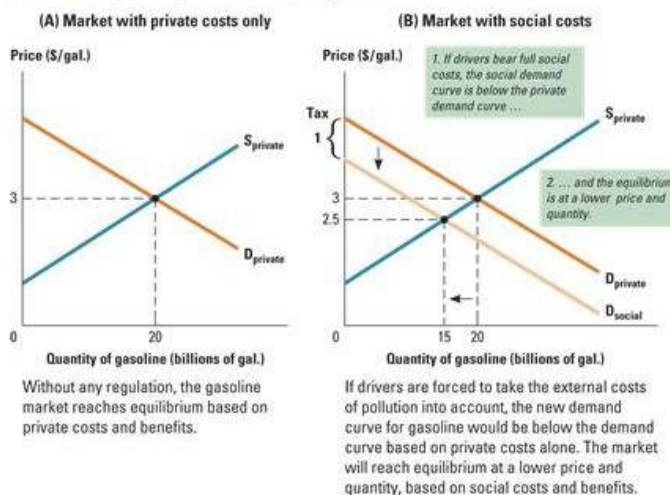
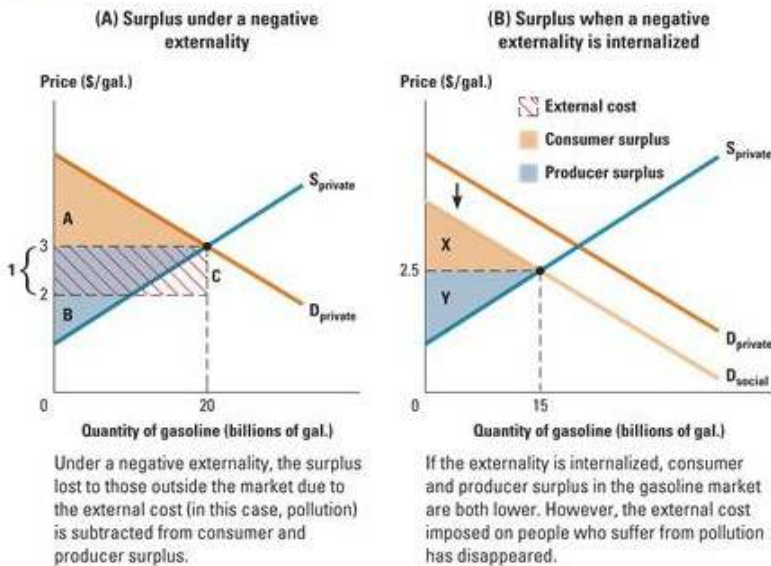


FIGURE 18-2

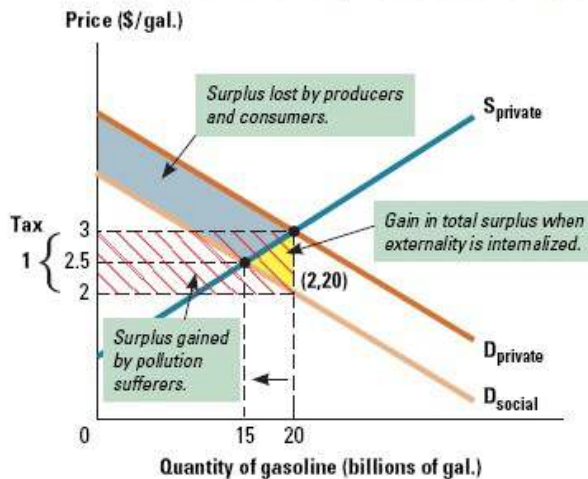
Markets fail to maximize total surplus in the presence of externalities



- A negative externality always reduced social surplus unless it is internalized.
- internalized means when participant has to pay the social cost of externality.

FIGURE 18-3

Internalizing a negative externality increases total surplus



The surplus gained by those outside the market due to the reduction in pollution is greater than the surplus lost by consumers and producers in the market for gasoline when the negative externality is internalized.

Positive externalities from the demand side

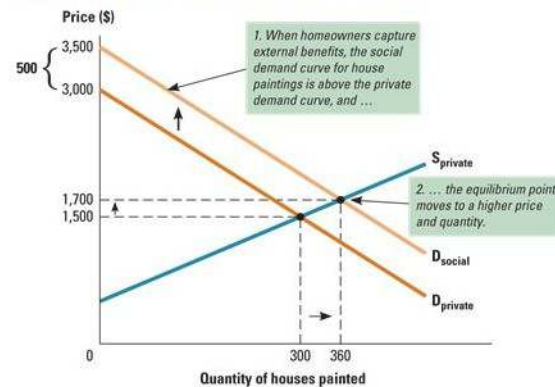
- Supposed a homeowner painting a house or planting flowers in the front yard or

adding a light in from porch provides \$500 in external benefit to the neighborhood.

- Socially optimal level of painting houses is more than privately optimal level.
- the demand curve shift to the right (goes above)
- The social surplus is consumer plus producer surplus plus the external benefit

FIGURE 18-4

Internalizing a positive externality increases demand



If homeowners are able to capture the external benefits of painting a house, a new demand curve is added above the old one and the market reaches an equilibrium with a higher quantity based on social costs and benefits.

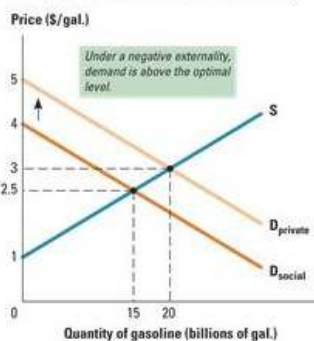
Positive externality from the supply side

- A positive externality also pushes quantity away from the efficient equilibrium level.
- a positive externality always reduces surplus unless it is internalized.

FIGURE 18-7

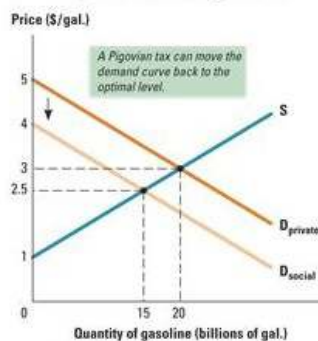
A tax counteracts the effect of a negative externality

(A) The effect of a negative externality



Under a negative externality, the demand curve ($D_{private}$) is above the level of demand that society as a whole would prefer (D_{social}). The difference between the curves is the external cost. From society's perspective, decision makers who are concerned only with their own private preferences will demand a quantity that is higher than the efficient level.

(B) The effect of a Pigovian tax



A Pigovian tax counteracts a negative externality. If the tax is set equal to the value of the external cost, the two cancel out, and the tax brings quantity back down to the efficient level.

Dealing with externalities

- solutions must ensure that individuals experience costs and benefits that are equal in value to the true social costs and benefits of their choices.
- This may require coordinating across millions of people.
- Because of the cost and difficulty of coordinating private solutions, people often turn to public policy for solutions to externalities.
- A pigovian tax (named after Arthur C. Pigou) counters the effects of negative externality; it counteracts a negative externality
- If the tax is set equal to the value of the external cost: The externality cost is canceled, quantity goes to the efficient level.

Dealing with negative Externalities: negotiation

Coase Theorem

- if there are 0 transaction costs to negotiate and agreements are enforceable, then an efficient equilibrium through private trade can be reached, even in the presence of an externality.
- often these 2 assumptions do not hold true.

Ronald Coase

- introduce the concept of "transaction cost" (Nature of the firm 1937).
- Showed that well-defined property right could overcome the problem of externality (Coase theorem) (the problem of social cost 1960)

Dealing with negative externalities: Tax

A pigovian tax (named after Arthur C. Pigou) counters the effects of negative externality; it counteracts a negative externality

If the tax is set equal to the value of the external cost: The externality cost is canceled, quantity goes to the efficient level.

There are 2 main problems with this solution:

1. Information problem: setting the tax at the right level
2. Political problem: no guarantee that the government can or will do anything to help people bearing the external cost.

Dealing with positive externalities: subsidy

if its positive externalities, we are producing too little.

If its negative externality, we are producing too much.

Dealing with negative externalities :quotas

- The problem of negative externality: too much consumption
- solution: restrict the consumption (quota: a limit on amount of gasoline)
- Every driver buys 20 gallons regardless of the difference in their net marginal benefits
- there is always a possibility to improve the situation
- total surplus is higher under the tax than under the quota

Dealing with externalities

- Using a quota to deal with externalities can be extended by permitting the buying

- and selling of quota allowances, a tradable allowance
- **Cap-and-Trade policy**
- **Tradable allowance:** a production or consumption quota that can be bought and sold
- Market quantity is socially optimal (efficient)
- total surplus is maximized
- tradable allowance does not create any government revenue, because no taxes are imposed.

Chapter 19: Public Goods and Common Resources

Characteristics of goods

- There are 2 important characteristics that determine how goods are used and whether

Excludability

- When a good is excludable, it is possible for sellers to prevent its use by those who have not paid for it.
- No one can eat "my" apple, it is excludable
- Anyone in neighborhood can use the light from my front porch light. it is nonexcludable.
- Goods may have different degrees of excludability. Sometimes it is possible, but too costly to exclude others.

Rivalry

- When a good is rival in consumption (or just rival), one person's consumption prevents or decreases others' ability to consume it
- If I eat my apple, no one can eat it. My consumption is rival to other's consumption
- My use of the light from my front porch light does not affect others' use of it. it is non rival.
- Goods may have different degrees of rivalry. sometimes many people can use a good but they bother each other.

Private goods

- **Excludable and rival:** plane tickets, pizza,
- The cost of excluding people from using it is trivial.
- Producers see the total costs and consumers see total benefits.
- Markets are **efficient** in producing these goods.

Public Goods

- **non excludable and non rival** : open source softwares, national defense (everyone can use and one's use doesn't effect other's)
- markets are **not efficient** in producing these goods.

Common resources (common-pool resource)

- **not excludable but rival:** forest, fisheries, wildlife (can't exclude u from use but ur use affects mine)
- it is non excludable. the cost of excluding people from using it is too high.
- markets are **not efficient** in producing these goods.--> insufficient porch light

Artificially scarce goods (club goods)

- excludable and non rival

- private parks, pay-per-view
- it is non rival, so one's use of it does not decrease other's use of it.
- it is excludable. the cost of excluding people from using it is trivial, for ex. only allow my friends to enter my park. can establish monopoly.
- markets are **efficient** in producing these goods.

Allocation of goods

- markets work well for allocating private goods efficiently, but not always so well for allocating public goods and common resources.

- **free-rider problem**
- **tragedy of the commons.**

The free-rider problem

- The free-rider problem occurs when someone decides to not pay for a public good and enjoys a "free ride" from those that have paid.
- The **free-rider problem** occurs when the **non-excludability** of a public good alone which leads to **undersupply** due to a loss of revenue.
- Free-riders enjoy positive externalities from others' choices to pay
- Under positive externalities, the equilibrium quantity is less than the level that maximizes total surplus.

The tragedy of the commons

- Depletion of common resources (rhinos)
- Common resources are not a public good (since they are rival), but they are non excludable.
- Nonexcludability causes demand to be higher than if people had to pay for what they consumed.
- rivalry causes quantity to dwindle (reduce).
- This combination leads to the tragedy of the commons, the **depletion** of a common resource due to **individually rational** but **collectively inefficient** overconsumption.
- The earth's atmosphere suffers from a tragedy of the commons problem

Dealing with public goods and common resources

- The problem with **undersupply** of public goods and **overdemand** for common resources leads to an inefficient quantity of production and consumption
- **Solutions** to these market failures fall under three categories:

social norms

government regulation and provision,

private property rights

Solution: government intervention

- Government bodies can impose consumption limits or make up for inadequate supply when individuals cannot.
- **Bans and quotas** are applied to common resource problems to reduce the inefficiency created by overuse.
- *potential shortcoming*: it may be too costly to monitor the behavior and enforce the law.
- To combat undersupply of public goods, the typical regulatory solution is **government provision**
- If the government is supplying a public good, the efficient quantity (optimal) is the one at which the marginal social benefit equals the cost. ($MB=MC$)
- set a fee, making public goods excludable
- 2 difficulties arise when attempting to provisions: calculating the marginal social benefit; how to finance the provision

Solution: Property rights

- In some cases, the most convenient solution to public good and common resource problems is to **privatize the goods**.
- **The patent system** is an example of turning a common resource(knowledge) into private property.
- --> it assures corporations that others will not be able to free-ride on their innovations.
- Assigning property rights over common resources often assign responsibility to the users of the good, introduce a kind of excludability.
- One common way that governments institute private property rights is through the use of **tradable allowances** or permits
- These work the same way as externalities
- They ensure that resources are allocated to those with the highest willingness to pay, while still limiting overall quantity to an efficient level.

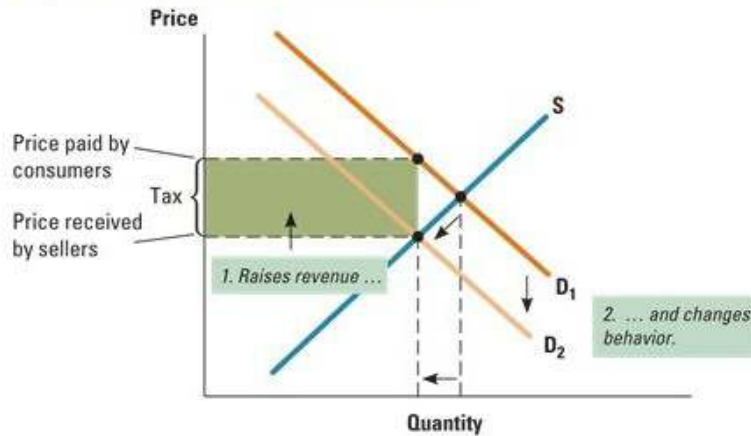
Chapter 20: Taxation and the Public Budget

Tax

- 2 effects
- raise revenue (government needs money to provide public goods)
- change the behaviors of buyers and sellers (the problem of too much)
- As a tax is levied on consumers, the demand curve shifts down by the amount of the tax

FIGURE 20-1

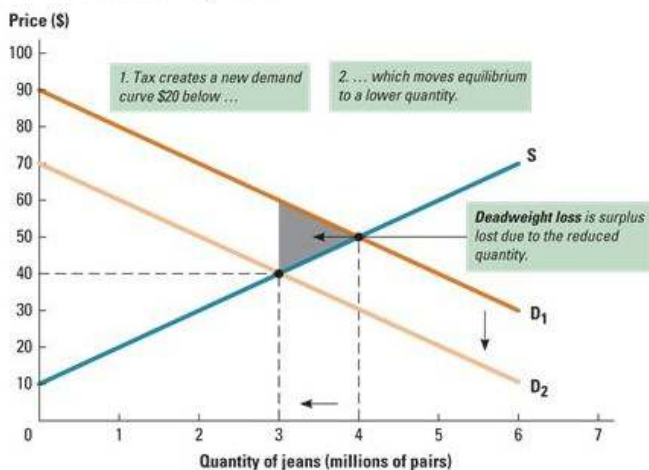
A tax raises revenue and changes behavior



A tax shrinks the market, moving equilibrium to a lower quantity and driving a wedge between the price paid by buyers and the price received by sellers. A tax also raises revenue, equal to the tax rate multiplied by the quantity traded under the new equilibrium.

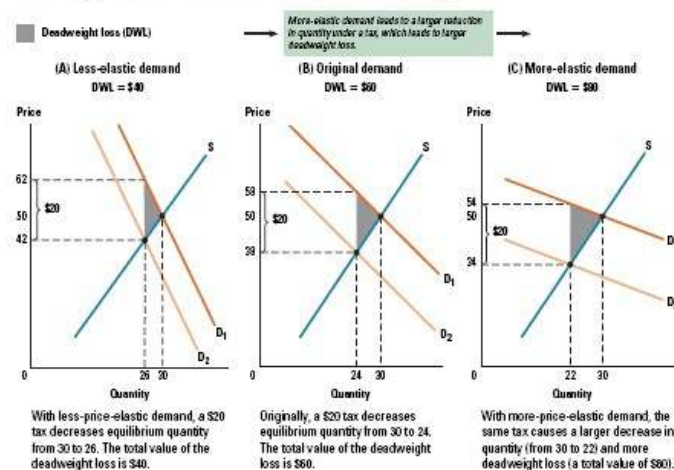
- Each tax considered must cope with trade-offs between revenue and inefficiency
- taxes cause changes in behavior and a deadweight loss to occur.

A tax causes deadweight loss



A tax of \$20 on jeans adds a new demand curve, sliding the equilibrium point along the supply curve from 4 million to 3 million pairs. The surplus lost to people who would have bought and sold those 1 million pairs of jeans but no longer do so under the tax is deadweight loss.

- The deadweight loss is the loss of total surplus that occurs because the quantity of a good that is sold is below the equilibrium
- The size of deadweight loss is determined by the price elasticity of supply and demand.

FIGURE 20-3**Deadweight loss increases with price elasticity**

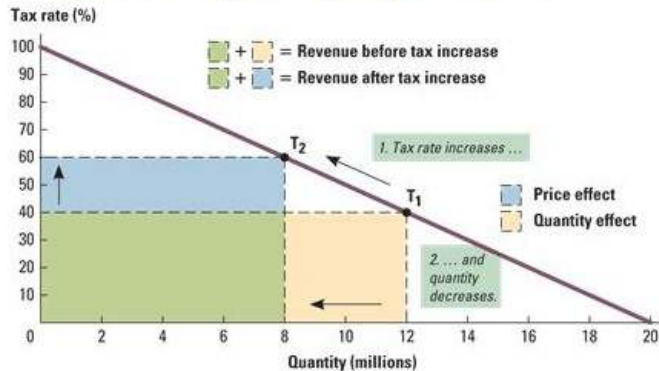
- all of above graphs the supply curve is the same, the demand curves are different.
- sharp demand curve means lower elasticity (low flexibility) (little change in quantity for same change of price)
- if u are flexible, u can avoid problem
- more elastic demand means more deadweight loss because people respond more quickly.
- If deadweight loss is minimized by taxing activities that people will continue to engage in, a tax on people just existing should minimize deadweight loss
- A **lump-sum (head) tax** charges the same amount to each taxpayer regardless of their economic behavior or circumstances: highly efficient, but people do not find it fair, size of the tax is limited by the poorest citizen's ability to pay. (it avoid deadweight loss)
- The second inefficiency is the **administrative burden**, which includes the logistical costs of implementing a tax.
- --> resources costs for government agencies (such as IRS) and for taxpayers (in the form of lawyers and filling out forms)
- The more complex the tax is, the higher the administrative burden will be.

Tax effects

- There are 2 opposing effects when a tax is increased
- The **price effect** increases tax revenue before price is higher
- The **quantity effect** decreases tax revenue because less quantity demanded

FIGURE 20-4

Raising taxes has both price and quantity effects on revenue



An increase in the tax rate increases the amount of revenue earned per unit, but the higher "price" of taxes means that quantity decreases. The net effect on revenue depends on whether the quantity effect outweighs the price effect.

As the tax rate increase, revenue will

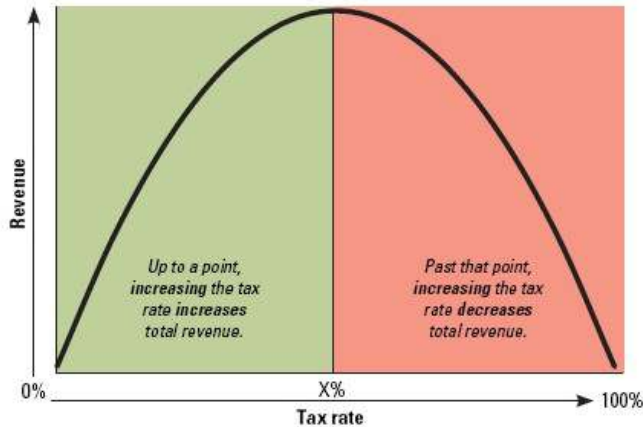
- increase as government gets more revenue per units sold (price effect)
- decrease as fewer units are sold. (quantity effect)

Diminishing returns to revenue

- Given these 2 opposing effects, there is a maximum tax revenue generated for a given tax
- as the tax rate increases from 0, the price effect dominate the quantity effect and revenue rises
- after the maximum, the tax rate is so high that the quantity effect dominates the price effect and revenue fall.
- the revenue maximizing tax rate depends on the elasticity of supply or demand
- This curve is sometimes referred to as the **Laffer curve**

FIGURE 20-5

Raising taxes first increases and then decreases revenue In the beginning, raising the tax rate increases revenue. After a certain point, further increases in the tax rate decrease the amount of revenue collected. At this point, maximum revenue is collected.



After the revenue-maximizing point, lowering taxes increases total revenue. The graph shown in [Figure 20-5](#) is sometimes referred to as the *Laffer curve*, after economics professor Arthur Laffer. As an advisor to President Ronald Reagan in the 1980s, Laffer argued that U.S. tax rates had become so high (especially on the wealthiest Americans who paid 70 percent of their income in taxes in 1980) that Reagan could achieve a

Incidence: who pay the tax?

- policy makers and taxpayers are concerned who pay it.
- The incidence of tax tells who bears the burden of a tax
- the **statutory incidence** tells who is legally obligated to pay the tax
- the **economic incidence** tells who will lose surplus due to a tax imposed

policy maker can affect the relative **economic incidence** of a tax burden by varying the tax rates between rich and the poor.

- **proportional/ flat tax**: same tax rate, differing amounts of taxes paid
- **progressive tax**: low-income pay lower rate than high-income, low-income pay less taxes than proportional
- **regressive tax**: low-income pay higher rate than high-income, high-income pay less taxes

A taxonomy of taxes

- The **income tax** is charged on the earnings of individuals and corporations
- the US income tax is based on expected annual income
- if actual earnings are less than expected earnings, individual receive a tax refund.
- if actual earnings are greater than expected earnings, individuals must pay the difference to the government.
- The **US income tax is progressive**, defined by income tax "**bracket**"
- Each tax bracket has its own tax rate, called the marginal tax rate: individual pay different amounts of taxes on each bracket of income earned.

- The personal income tax does not distinguish incomes by their sources, except for capital.
- The **capital gain tax** is applicable on all income earned/lost by buying and selling of investments
- Taxed a lower rate than most other income (Warren buffet case)
- In the US, part of one's income is taxed based on wages (and not other sources of income)
- **payroll taxes** (FICA) are applied to paychecks. a tax on the wages paid to an employee

Corporate income tax and other taxes

- corporation also pay taxes, the most prominent being the corporate income tax
- A **sale tax** is charged on the sale of a good or service being purchased (Major source of revenue for state government), (no US federal sales tax)
- **Excise tax** is a sales tax on a specific good or service (alcohol, cigarettes, gasoline...)
- A **property tax** is charged on the estimated values of a home or other property
- **Local tax** authorities assess property values every few years and levy a fraction of the value as the tax

The public budget

- The tax revenue received by the government is included with other sources of revenue to **finance government spending**
- Tax revenue as a percent of GDP
- The relationship between public revenues and public spending is messy
- Spending eventually has to be covered by revenues
- most public spending is not tied directly to government revenue nor particular taxes