ECON2103

Chapter1 Sep 3

Economy: Households and econ have much in common

Households face many decisions: allocate scarce resources, ability, effort, and desire

Society faces many decisions: allocate resources and output

Resources are scarce

Scarcity:

- The limited nature of society's resources
- Society has limited resources and therefore cannot produce all the goods and services people wish to have

Economics:

- How society manages its scarce resources
- How people make decisions

Economists study:

- How people make decisions
- How people interact with one another
- Analyze forces and trends that affect the econ as a whole
    - Growth in average income
    - Fraction of population that cannont find job
    - Rate at which prices are rising

How people make decisions:

- People face trade-offs
    - "There aint's no such thing as a free lunch"
        - To get something that we like, we usually have to give up something else that we also like
    - Making decisions: trade off one goal against another
    - Trade offs: (students: time); (Parents: income); Society: (National defense vs consumer goods); (Clean environment vs high level of income); (efficiency vs equality)
        - Efficiency: society getting maximum benefits from its scarce resources
        - Equality: distributing economic prosperity uniformly among members of society
- The cost of sth. is what you give up to get it

    - People face trade-offs: make decisions, compare cost with benefits of alternatives
    - *Opportunity cost*: Whatever must be given up to obtain some item
- Rational people think at the margin?
    - Rational People: systematically and purposefully do the best they can to achieve their objectives
    - Marginal changes: small incremental adjustments to a plan of action
    - Rational decision maker: make decisions by comparing marginal benefits and marginal costs; take action only if marginal benefits > marginal costs
- People respond to incentives
    - Something induces a person to act
        - Higher Price: buyers consume less; sellers produce more
        - Public Policy: change costs or benefits; change people's behavior; could have unintended consequences

How people interact:

- Trade can make everyone better off
    - Trade allows each person to specialize in the activites he or she does best
    - Enjoy a greater variet of goods and services at lower cost
- Markets are usually a good way to organize economic activity
    - Market: a group of buyers and sellers (need not be in a single location)
    - Organize economic activity means: what goods to produce; how to produce them; how much of each to produce; who gets them
    - Adam Smith's "invisible hand":
        - Households and firms interacting in markets: act as if they are guided by an "invisible hand"; leads them to desirable market outcomes
        - Corollary: Government intervention prevents the invisible hand's ability to coordinate the decisions of the households and firms that make up the economy
- Governments can sometimes improve market outcomes
    - We need government:
        - enforce rules and maintain institutions that are key to a market economy
        - enforce property rights
        - promote efficiency, avoid market failure
        - promote equality, avoide disparities in economic wellbeing
    - Market Failure: when the markets fails to allocate society's resources efficiently
    - Causes of market failure:
        - Externalities, when the production or consumption of a good affects bystanders e.g. pollution
        - Market power, a single buyer or seller has substantial influence on market price e.g. monopoly
    - Public policy may **promote efficiency**
    - Government may alter market outcome to promote equity

    - If the market's distribution of economic wellbeing is not desirable, tax or welfare policies can change how the economic "pie" is divided.

How economy as a whole works:

- A country's standard of living depends on its ability to produce goods and services
    - Large differences in living standards
        - Among countries: Average annual income, 2014: $55,000 (U.S.);

          $17,000 (Mexico)$;13,000 (China); $6,000 (Nigeria)
        - Over time: In the U.S. incomes have historically grown about 2% per year
    - Explanation: differences in productivity
    - Productivity:
        - Quantity of goods and services produced from each unit of labor input
        - Higher productivity: Higher standard of living
        - Growth rate of nation's productivity: Determines growth rate of its average income
- Prices rise when the government prints too much money
    - Inflation: an increase in the overall level of prices in the economy
    - Causes for large or persistent inflation: growth in quantity of money: value of money falls
- Society faces a short-run trade-off between inflation and unemployment
    - Short-run effects of monetary injections:
        - Stimulates the overall level of spending: Higher demand for goods and services
        - Firms raise prices; hire more workers; produce more goods and services
        - Lower unemployment
    - Short-run trade-off between unemployment and inflation

      Key role–analysis of business cycle
    - Business cycle

      Fluctuations in economic activity

      Employment, Production

Sep 7 Chapter 2

Cast-aways face trade off

Limited resources: effort and time

catch fishes, gather coconut, how to utilize resources as efficient as possible

To describe all the trade off, so called PPF production, possibility frontier

The bowed-out shape of the production possibility frontier reflects increasing opportunity cost

PPF is a boundary, all of the possible combinations between two goods, utilize all of the resources available.

Economists play two roles: Scientists: try to explain the world; Policy advisors: try to improve it.

`Positive statements` which attempt to describe the world as it is.

`Normative statements` which attempt to prescribe how the wolrd should be, ought to be.

Note: Positive statemenets can be confirmed or refuted, normative statements cannot.

economists employ the scientific method, the dispassionate development and testing of theories about how the world works. Assumptions simplify the complex world, make it easier to understand.

Do not omit necessary requirements, do not want to change substantially without substantially changing the result.

`Model`: a highly simplified representation of a more complicated reality. Economists use models to study economic issues.

The Circular-Flow Diagram

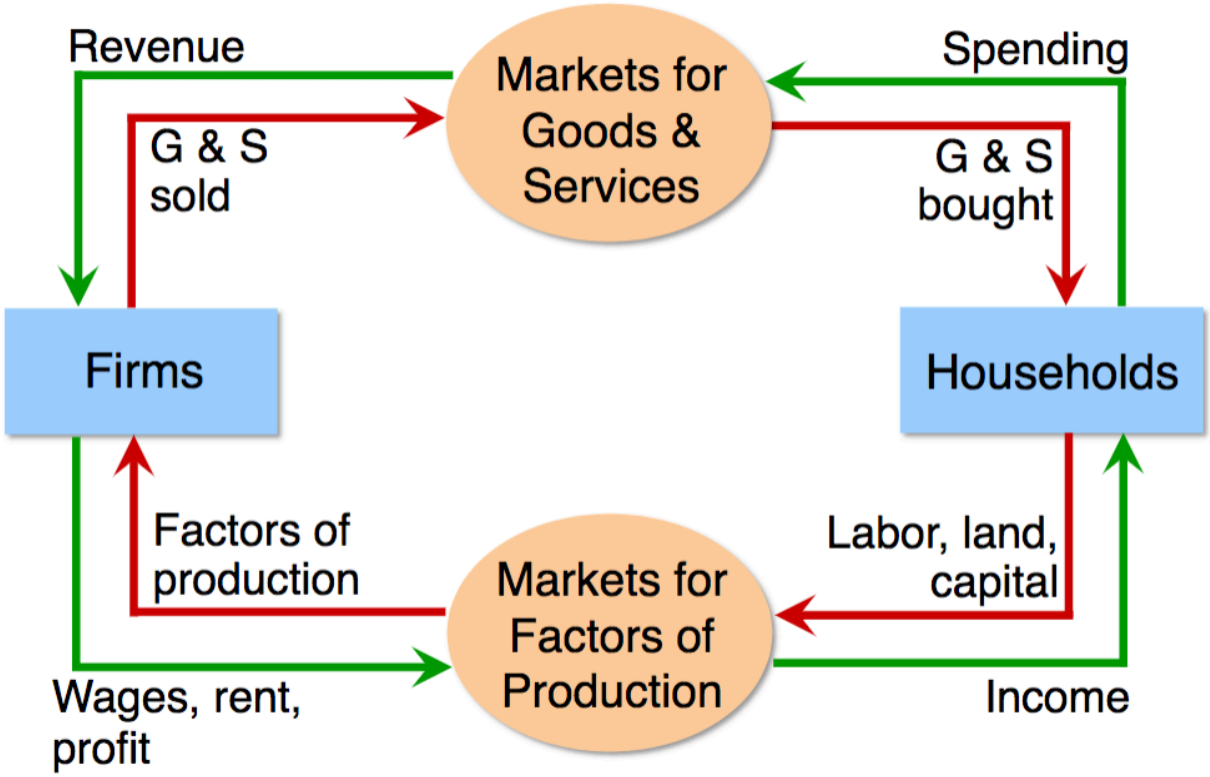
a visual model of the economy, shows how dollars flow through markets among households and firms

money, labor markets

Two types of "actors": households, firms; Two markets: market for goods and services, market for `factors of production`

Factors of production: the resources the economy uses to produce goods & services, including labor, land, capital (building and machines used in production), entrepreneurship

Inner flow: physical flow, outer flow: payment flow



Households: own the factors of production, sell/rent them to firms for income; Buy and consume goods & services

Firms: buy/hire factors of production, use them to produce goods and services; sell goods and services

Production Possibilities Frontier (PPF)

a graph that shows the combinations of two goods the economy can possibly produce given the available resources and the available technology. PPF illustrates the `trade-offs` facing an economy that produces only two goods.

3 assumptions: two goods, resources, technology (not change)

Available resources, labor 50000 labor hours per month

Available technology, producing one computer requires 100 hours

P16 resources allocation possiilities,

Production possibilities

P17 frontier: boundary between a combination of can be produced and cannot be produced, the best you can do, utilize all the reosources; Cannot achieve the combination.

If you go along PPF, involves trade-offs. Every single point, every single choice is a trade-off

P18 Point F: does not use all the resources, wasting some of the resources

Point G: Unattainable, beyond the availability of the resources, to produce at the combination need a lots of labor hours

Points of PPF: possible, efficient (all resources are fully utilized)

Points under the PPF: possible, not efficient (some resources are underutilized, workers unemployed, factories idle)

Points above the PPF: not possible

The `opportunity cost` of an item is what must be given up to obtain that item.

Moving along the PPF involves a trade-offs: give up something to obtain something -> opportunity cost

The slope of the PPF tells you the opportunity cost of one good iterms of the other

`Straight line`: constant opportunity cost

`Bowed outward`: increasing opportunity cost

With additional resources or an improvement in technology, the economy can produce more computers, more wheat, or any combination in between. Economic growth shifts the PPF outward

Why the PPF might be bowed-shaped?

- Different workers have different skills;
- different opportunity costs of producing one good in terms of the other;
- There is some other resource, or mix of resources with varying opportunity costs (e.g. different types of land suited for different uses)

`Microeconomics` is the study of how households and firms make decisions and how they interact in markets.

`Macroeconomics` is the study of economy-wide phenomena, including inflation, unemployment, and economic growth.

Economists often give conflicting policy advice; they disagree about the validity of alternative positive theories about the world. They may have different values and, different normative views about what policy should try to accomplish.

Use shape of PPF to quantify opportunity cost, figure out the numerical value of opportunity cost. The slope of the PPF tells you the opportunity cost of one good (of the x-axis) in terms of the other

OC = Q of the other good given up / Q of one good obtained

Need subscript c for computer

inverse of OC_c is OC_wheat

Beware of who is x-axis and y-axis. You need the units.

Sep 10

Rotation of PPF

slope of PPF is the opportunity cost of PPF

Bowed outward:

At first, do not sacrifice much of the corn to produce wheat

Sacrifice a lot of production of wheat,

the source of the "bow"

Absolute advantage: productivity

Note that the table on page 6 is both production and consumption bundle

Without trade, they consume what they produce

On page 9, the production present their specialization

Trading Price

Sep 14

With trade, Specialization

Production bundle will be the intercept on x and y axis

Additional increase in meat is the gain from trade.

P12 Productivity is the only determinant of absolute advantage

Different producers have different strength, specialization can make both of them better off.

AA->Specialization->(by trade) mutually beneficial to both party x

you do not have the first link

Comparative advantage

What is comparative advantage

P14 to describe the change, counter clockwise rotation, technology advance

When no trade, production and consumption bundle are the same

comparative advantage: keyword is opportunity cost

One person can have an absolute advantage in both goods, she cannot have an comparative advantage in both goods.

aa can be indicated by the level of intercepts

Driven force is CA but not AA

P21 We do not need a fixed allocation of working hour, we provide one possible case

Specialization

Next Step: to trade

P22 the price of trade must lie between the two opportunity cost

If TP = 3, 1M: 3P, F(p) = R(M) =

P23 Acceptable Interval for F (0, 4]

Acceptable interval for R [2, \infty)

Trading price would be intercept of the two sets

P 26 trade line

slope of trade line : trading price

Sep 21 Chapter 4

The Market Forces of Supply and Demand

A `market` is any arrangement that enables buyers and sellers to get information and do business with each other.

A `competitive market` is one with many buyers and sellers, each has a negligible effect on price.

In a `perfectly competitive` market: All goods are exactly the same; Buys and sellers are so numerous that no one can affect market price -- each is a `price taker`

If you demand something, then you: want it; Can afford it, and; Have made a definite plan to buy it.

`Wants` are the unlimited desires or wishes people have for goods and services. Demand reflects a decision about which wants to satisfy.

The `Quantity Demanded` of a good or service is the amount that consumers plan to buy during a particular time period, and at a particular price.

Q^d vs D (the curve, the relationship)

`Demand`: the line relating prices and quantity demanded is called `demand curve`;

It is likely to be a downward slopping curve, other things being equal, a lower price means a greater quantity demanded.

`Law of demand`: the claim that the quantity demanded of a good falls when the price of the good rises, other things equal

."Other things" include all factors that affect quantity demanded: income, price of "related" goods, etc. Changes in them shift the Demand curve

`Demand Schedule`: a table that shows the relationship between the price of a good and the quantity demanded

`Market Demand` versus `Individual Demand`

The quantity demanded in the market is the sum of the quantities demanded by all buyers at each price.

"Move" of a curve: Change in demand, move/shift of a demand curve

"Move along a curve": Change in quantity demand: move along demand curve

`Endogenous` vs `Exogenous`: Price of substitute, preferences and many other factors

`Change in Quantity Demand`: Change in Qd in response to change in Price

`Change in Demand`: Change in relationship between Price and Qd

Variables that influence buyers: price causes a movement along the D curve and also damand curve shifters.

Demand Curve Shifters

- Number of Buyers

  Increase in # of Buyers increases quantity demanded at each price, shifts D curve to the right.

- Income

  Demand for a `normal good` is positively related to income.

  Increase in income causes increase in quantity demanded at each price, shifts D curve to the right.

  Demand for an `inferior good` is negatively related to income. An increase in income shifts D curves for inferior goods to the left.

  Bus rides vs Taxi rides

- Prices of Related Goods

  Two goods are `substitues` if an increase in the price of one causes an increase in demand for the other.

  Two goods are `complements` if an increase in the price of one causes a fall in demand for the other. $P_B \uparrow \Rightarrow D_A \downarrow$

  computer and software

- Tastes

Anything that causes a shift in tastes toward a good will increase demand for that good and shift its D curve to the right

Exp: The Atkins diet became popular in the ’90s, caused an increase in demand for eggs, shifted the egg demand curve to the right.

- Expectations

  Expectations affect consumers' buying decisions

  Exp: If people expect their incomes to rise, their demand for meals at expensive restaurants may increase now. If the economy sours and people worry about their future job security, demand for new autos may fall now.

Active Learning 1: Demand Curve

A. Right, because it is complements B. Move down C. Left, because it is substitutes

Chapter 3 Exercise: BC

Active Learning: absolute and comparative advantage P30

10000 hours available resources

Brazil has absolute advantage in

CA wine

Sep 24

`Supply`

The `quantity supplied` of any good is the amount that sellers are willing and able to sell

`Law of Supply`: the claim that the quantity supplied of a good rises when the price of the good rises, other things equal

$P \uparrow \implies \pi \uparrow \implies Q^S \uparrow$

Upward slope

`Supply Schedule`: a table that shows the relationship between the price of a good and the quantity supplied

`Market Supply Curve`: the quantity supplied in the market is the sum of the quantities supplied by all sellers at each price; shows how price affects quantity supplied , other things being equal; other things are non-price determinnants of supply, changes in which shift the S curve.

Price and Quantity supplied, endogenous variable

`Supply Curve Shifters`

- Input prices: wages, prices of raw materials

  A fall in input prices makes production more profitable at each output price, so firms supply a larger quantity at each price, and the S curve shifts to the right

  Cost of Production$\downarrow \implies S \uparrow$ shift of the curve to the right
- Technology: determines how much inputs are required to produce a unit of output.

  A cost-saving techological improvement has the same effect as a fall in input prices, shifts S curve to the right
- Number of Sellers: an increase in the number of sellers increases the quantity supplied at each price, shifts S to the right
- Expectations

  Events in the Middle East lead to expectations of higher oil prices. In response, owners of Texas oilfields reduce supply now, save some inventory to sell later at the higher price. Storage is part of business strategy and so today's S curve shifts left.

  In general, sellers may adjust supply when their expectations of future prices change if good is not perishable.

`Equilibrium` P has reached the level where quantity supplied equals quantity demanded

`Equilibrium Price` P^* the price that equates quantity supplied with quantity demanded

`Equilibirum Quantity` Q^* the quantity supplied and demanded at the equilibrium price

All the internal forces are mutually balance, static status, unless external force come in to play. In the time of external force change, take time to restore equilibrium

Perfect Competitive Market

`Market Mechanism` is at the intersection of Demand and Supply under the Perfect Competitive Market (structure).

At Equilibrium Market Price: No buyer is willing to pay a higher price; So, no seller is able to sell higher. Therefore, buyers and sellers are `Price Taker`

If a price (P') higher than P^*, we have excess supply `Surplus`: $Q^S > Q^D$

If a price (P') lower than P^*, we have excess demand `Shortage`: $Q^D > Q^S$

Suppose $P' > P^*$, while facing a surplus, sellers try to increase sales by cutting price. This causes Q^D to rise and Q^S to fall which will reduces the surpllus.

What will happen to the market over time? Prices continue to drop to the equilibrium level.

Suppose $P' < P^*$, while facing a shortage, sellers try to raise the price, causing Q^D to fall and Q^S to rise which reduces the shortage. Prices continue to rise until market reaches equilibrium

market price is too low. Selles what to produce less . consumer wants more

`Law of Supply and Demand`: the price adjuists to bring Q^s and Q^d into balance

Only temporary phenomenom

Three steps to analyzing changes in equilibrium

1. To determine the effects of any event, decide whether the event shifts S curve, D curve, or both.
2. Decide in which direction curve shifts
3. Use supply-demand diagram to see how the shift changes equilibrium P and Q.

The Market for Hybrid Cars

Increase in price of gas: D shifts; shifts right; Increase in Price and Quantity

New Tech: S shifts; shifts right; Price to fall and quantity to rise

Price of gas rises AND new tech reduces production costs: Both D and S shifts; D right and S right; Q rises, but effect on P is ambiguous: if demand increases more than supply, P rises; if supply increases more than demand, P falls.

`Shifts`: Change in Supply; Change in Demand

`Movement along curve`: Change in the quantity supplied; Change in the quantity demanded

Example 1: a shift in demand

New Tech $S \uparrow \implies P^* \downarrow, Q^* \uparrow$

Price of Gas$\uparrow$ $D \uparrow \implies P^* \uparrow, Q^* \uparrow$

How to know if $D \uparrow > S \uparrow$

D increase by |AC| and S increases by |AB|

B is the intersection of P_1 A and Supply

C is the intersection of P_1 A and Demand

A is first equilibrium point

If shift by same distance, the market price remains unchanged but with different quantity

Active Learning 2

move down, shift right, only changes the demand curve

c) Supply curve remains unchanged, demanded curve is shifted

In exam, you must draw figures

Sep 28

No matter the price, she will just buy one.

`Elasticity` is responsiveness. Elasticity measures how much one variable responds to changes in another variable

- `Price Elasticity`: Change in quantity demanded in response to change in price
- `Income Elasticity`: Change in quantity demanded in response to change in income
- `Cross-price Elasticity`: Change in quantity demanded of A in response to change in price of B

Price Elasticity of Demand measures how much Q^d responds to a change in P. Loosely speaking, it measures the price-sensitivity of buyers' demand.

Price elasticity of demand = percentage change in Q^d/percentage change in P

$\epsilon = \frac{\%\Delta Q^d}{\%\Delta P}$, dealing the calculation, we drop the minus sign as D is downward sloping.

Calculating Percentage Changes: (end value - start value)/start value * 100%

Problem: The standard method gives different answers depending on where you start

`midpoint method`: (end value - start value)/midpoint * 100%

What determines price elasticity?

The prices of both of these goods rise by 20%. For which good does Q^d drop the most?

- Availability of Close Substitutes
    - Breakfast Cereal vs. Sunscreen:
    - Breakfast cereal has close substitutes, so buyers can easily switch if the price rises
    - Sunscreen has no close substitutes, so a price increase would not affect demand very much.

    - *Price elasticity is higher when close substitutes are available*
- Definition of the Market
    - Blue Jeans vs. Clothing:
    - For a narrowly defined good such as blue jeans, there are many substitutes (khakis, shorts, Speedos).
    - There are fewer substitutes available for broadly defined goods.
    - *Price elasticity is higher for narrowly defined goods than for broadly defined ones*.
- Necessities vs. Luxuries
    - Insulin vs. Caribbean Cruises
    - To millions of diabetics, insulin is a necessity. A rise in its price would cause little or no decrease in demand.
    - A cruise is a luxury. If the price rises, some people will forego it.
    - *Price elasticity is higher for luxuries than for necessities*
- Time Horizon
    - Gasoline in the Short Run vs. Gasoline in the Long Run
    - There's not much people can do in the short run, other than ride the bus or carpool.
    - In the long run, people can buy smaller cars or live closer to work.
    - *Price elasticity is higher in the long run than the short run*

Exercise:

1.a. Mystery novels have more elastic demand. Because required textbooks are necessitities. and close substitutes

1.b. Beethoven recordings have more elastic demand. Because price elasticity is higher for narrowly defined goods than for broadly defined ones.

1.c. Price elasticity is higher in the long run than the short run

1.d. Luxuries vs. Necessities

The price elasticity of demand is closely related to the slope of the demand curve.

The flatter the curve, the bigger the elasticity. The steeper the curve, the smaller the elasticity

Five classifications of D curves

`Perfectly inelastic demand`: Price elasticity of demand = %change in Q/ %change in P = 0%/10% = 0

vertical D curve, no consumers' price sensitivity;

`Inelastic demand`: Price elasticity of demand < 1

relatively steep D curve, relatively low consumers' price sensitivity;

`Unit elastic demand`: Price elasticity of demand = 1

intermediate slope D curve; intermediate consumers' price sensitivity

`Elastic demand`: Price elasticity of demand > 1

relatively flat D curve, relatively high consumers' price sensitivity

`Perfectly elastic demand`: Price elasticity of demand = infinity

horizontal curve , extreme consumers' price sensitivity

Exp: Wheat, selling a product that has perfect substitutes

The `total revenue` from the sale of a good or service equals the price of the good multiplied by the quantity sold: Revenue = $P \times Q$

A price increase has two effects on revenue: Higher P means more revenue on each unit you sell; but you sell fewer units (lower Q).

Which of these two effects is bigger? *It depends on the price elasticity of demand*

- When demand is elastic, the quantity effect dominates the price effect; so a fall in price increases total revenue.
- When demand is inelastic, the price effect dominates the quantity effect; so a fall in price decreases total revenue.
- When demand is unit elastic, two effects exactly balance; so a fall in price has no effect on total revenue.

Elasticity of a linear demand curve

The slope of a linear demand curve is constant, but its elasticity is not. The demand schedule in the table was used to calculate the price elasticity of demand by the midpoint method. *At points with a low price and high quantity, the demand curve is inelastic. At points with a high price and low quantity, the demand curve is elastic.*

Active Learning 1

Time Horizon: Time elapsed since price changed

Time elapsed in long run, elasticity is higher

Oct 12 Chapter 7

`Resource Allocation Methods`

Market Price

When a market allocates a scarce resource, the people who get the resource are those who are willing to pay the market price. Most of the scarce resources that you supply get allocated by market price. You sell your labor services in a market, and you buy most of what you consume in markets. For most goods and services, the market turns out to do a good job.

Command System

Planned/Command Economy

Command system allocates resources by the order (command) of someone in authority. For example, if you have a job, most likely someone tells you what to do. Your labor time is allocated to specific tasks by command. *A command system works well in organizations with clear lines of authority* but badly in an entire economy.

Majority Rule

Majority rule allocates resources in the way the majority of voters choose. Societies use majority rule for some of their biggest decisions. Majority rule works well when the decision affects lots of people and self-interest must be suppressed to use resources efficiently.

Contest

A contest allocates resources to a winner (or group of winners). The most obvious contests are sporting events but they occur in other arenas: For example, The Oscars are a type of contest. *A contest works well when the efforts of the "players" are hard to monitor and reward directly.*

First-Come, First-Served

First-come, first-served allocates resources to those who are first in line. Casual restaurants use first-come, first served to allocate tables. Supermarkets also uses first-come, first-served at checkout. *First-come, first-served works best when scarce resources can serve just one person at a time in a sequence*.

Lottery

Lotteries allocate resources to those with the winning number, who draw the lucky cards, or who come up lucky on some other gaming system. State lotteries and casinos reallocate millions of dollars worth of goods and services each year. But lotteries are more widespread. For example, they are used to allocate landing slots at some airports and places in some marathons. *Lotteries work well when there is no effective way to distinguish among potential users of a scarce resource.*

Allocation of resources refers to:

- how much of each good is produced
- which producers produce it
- which consumers consume it

`Welfare economics` studies how the allocation of resources affects economic well-being. We first look at the well-being of consumers.

`Willingness to Pay` WTP

A buyer's `willingness to pay` for a good is the maximum amount the buyer will pay for that good. WTP measures how much the buyer values the good.

Maximum price level that you are willing to pay to buy that item.

Different person has different willingness to pay.

willingness to pay is equal to the value of happiness. Will be happy if P<wtp, happy to purchase. If P =wtp, indifferent.

The item will go to the buyer who values the item most highly

It relates to the demand schedule and the demand curve

WTP, values, D

`Consumer Surplus`

At any Q, the height of the D curve is the WTP of the marginal buyer, the buyer who would leave the market if P were any higher.

Consumer surplus is the amount a buyer is willing to pay minus the amount the buyer actually pays:

$$CS = WTP - P$$

Consumer surplus in a market is the area below the demand curve and above the price.

P is the line of $P = x$. For a perfect competition market, price level p^* is fixed

Two reasons for the fall in Consumer Surplus:

- Fall in CS due to buyers leaving the market, (triangle part)
- Fall in CS due to remaining buyers paying higher P, (rectangle part)

CS with lots of Buyers, then D curve tends to have a smooth D curve

At any point, there is a marginal buyer.

`Cost` is the value of everything a seller must give up to produce a good (i.e. opportunity cost). Includes cost of all resources used to produce good, including value of the seller's time. A seller will produce and sell the good/service only if the price exceeds his or her cost. Hence, cost is a measure of willingness to sell.

`Producer Surplus` the amount a seller is paid for a good minus the seller's cost.

$PS = P - cost$

Total PS equals the area above the supply curve under the price from 0 to Q.

Net happiness/benefit

Two reasons for the fall is PS:

- Fall in PS due to sellers leaving market
- Fall in PS due to remaining sellers getting lower P

CS, PS, and Total Surplus

CS = (value to buyers) - (amount paid by buyers) = buyers' gains from participating in the market

PS = (amount received by sellers) - (cost to sellers) = sellers' gains from participating in the market

`Total surplus` = CS + PS = total gains from trade in the market = (value to buyers) - (cost to sellers)

Net benefit for the whole society

`Efficiency`

An allocation of resources is **efficient** if it maximizes total surplus. Efficiency means:

- The goods are consumed by the buyers who value them most highly.
- The goods are produced by the producers with the lowest costs.
- Raising or lowering the quantity of a good would not increase total surplus.

Evaluating the Market Equilibrium, is the market equilibrium efficient?

(P33) At quantities less than the equilibrium quantity, such as Q_1 , the value to buyers exceeds the cost to sellers. At quantities greater than the equilibrium quantity, such as Q_2 , the cost to sellers exceeds the value to buyers. Therefore, *the market equilibrium maximizes the sum of producer and consumer surplus* (total surplus). (why?)

Market allocation is efficient!

Three `market outcomes`:

- The buyers who value the good most highly are the ones who consume it. (Market outcome 1)
- The sellers with the lowest cost produce the good. (Market outcome 2)
- The market equilibrium quantity maximizes total surplus: (Market outcome 3)

Market Efficiency:

Efficiency: Property of a resource allocation; *Maximizing the total surplus* received by all members of society

Equality: Property of distributing economic prosperity uniformly among the members of society.

Gains from trade in a market: Like a pie to be shared among the market participants.

The question of efficiency: Whether the pie is as big as possible

The question of equality: How the pie is sliced; How the portions are distributed among members of society

Several assumptions about how markets work:

Markets are perfectly competitive

Outcome in a market matters only to the buyers and sellers in that market.

Sometimes these assumptions do not hold, "market equilibrium is efficient" may no longer be true – `market failures` occur.

Such market failures occur when:

- a buyer or seller has `market power` - the ability to affect the market price. (when market is not perfect competitive)
- transactions have side effects, called `externalities`, that affect bystanders. (example: pollution)

`Welfare Economics`

Under perfect competition, the market outcome is efficient. Altering it would reduce total surplus.

Oct 22

Monopoly, perfect competition

Monopoly -> least competition level

Oligopoly

Monopolistic Competition market type

Perfect Competition: Ch4; $P^{*}andQ^{*}$ push the market toward equilibrium

No government intervention, Welfare analysis

equilibrium might not please the buyer or seller, market equilibrium is too high or too low, Efficient (Total Surplus is maximized)

Government intervention, Chapter 6 and 8

- Price Control two directions: price ceiling and price floor
- only effective if beyond the equilibrium price level or below the equilibrium

Both bring inefficient market result

Price control are not fair (inefficient)

Tax is today's topic

Poll tax (Head Tax)

Question

HK Government

No tax, equilibrium price

$P_B = P_S = P^* = \$10$

True or False, Buyers undertake the entire tax burden?

It does not matter, whether which curve is shifting, you will have the same result anyway

To investigate the tax incidence, not matter at all, tax improvisation

A tax burden falls more heavily on the side of market that is less elastic

Active Learning 3

Supply curve will be less elastic

steep supply curve, flat demand curve in labor market

Labor is the seller

Chapter 6 & 8 Government Meets Market

Part I

Government policies that alter the private market outcome

Government may believe the equilibrium price determined by free-market is not desirable or appropriate, and try to intervene:

- Price controls
  - Price ceiling: a legal maximum on the price of a good or service, rent control
  - Price floor: a legal minimum on the price of a good or service, minimum wage
- Taxes
  - The government can make buyers or sellers pay a specific amount on each unit.

Use supply/demand model to see how each policy affects the market outcome

A price ceiling above the equilibrium price is not binding --- has no effect on the market outcome.

The equilibrium price is above the ceiling and therefore illegal. The ceiling is a binding constraint on the price, causes a shortage.

In the long run, supply and demand are more price-elastic. Therefore, the shortage is larger.

Rent Ceiling

When the rent ceiling P' is enforced, Q'_s is the number of apartments available in the market. Suppose the highest WTP consumers get apartments, rent control transfer surplus from producers to consumers. `Reallocation` of surplus among buyers & sellers.

$Qs' < Q^*$

Deviation from the Q^* where the total surplus is maximized.

`Dead-weight-loss` DWL presents due to mutual benefit exchange cannot realized

Upper part is the loss of CS; Lower part is the loss of PS

Inefficient

Are rent ceiling fair?

When price adjustments are blocked, other methods of allocating scarce housing resources operate that do not produce a fair outcome.

Who will be "rationed" apartments?

Under price control, price cannot function to solve shortage. Give rises to discrimination, black market, first-come first served, lottery, etc. Unfair

Besides, what if certain non-price rationing methods leads to low WTP get the apartment? Further loss of surplus, size of CS will be further reduced

Shortages and Rationing

With a shortage, sellers must ration the goods among buyers

Some rationing mechanisms: Long lines; Discrimination according to sellers' biases

These mechanism are often unfair, and inefficient: the goods do not necessarily go to the buyers who value them most highly.

In contrast, when prices are not controlled, the rationing mechanism is efficient (the goods go to the buyers that value them most highly) and impersonal (and thus fair).

Why are there price ceilings?

It benefits minority of renters; price ceiling has been in effect for a long time; Government officials may not consider supply and demand analysis.

Exercises P14

B, C

A price floor below the equilibrium price is not binding --- has no effect on the market outcome.

The equilibrium wage is below the floor and therefore illegal. The floor is a binding constraint on the wage, causes a surplus (unemployment)

Minimum wage laws do not affect highly skilled workers. They do affect teen workers. Studies: a 10% increase in min wage raises teen unemployment by 1-3%.

Minimum Wage - Price Floor

Black market can happen (below W' wage) or workers to "pay" to get a job

Surplus transferred to workers (suppliers).

If government enforcement is not effective, surplus will be transferred back to employers (black market payment). With black market wage, quantity demand of labor could be higher than L'_d.

Evaluating Price Controls

Markets are usually a good way to organize economic activity

Prices are the signals that guide the allocation of society's resources. This allocation is altered when policymakers restrict prices.

Price controls often intended to help the poor, but often hurt more than help.

Taxes

Government needs funding to operate, legal system, infrastructure, military forces

Government uses taxation as a policy tool

- Sales tax on cigarette to deter smoking
- Tariffs to deter the amount of imports
- Progressive income tax arrangement for redistribution purpose

Examples: Corporate tax, income tax, sales tax, tariff (import tax), etc

Everything you earn and most things you buy are taxed.

Who really pays these taxes?

`Tax incidence` is the division of the burden of a tax between buyers and sellers.

When an item is taxed, its price might rise by the full amount of the tax, by a lesser amount, or not at all.

- If the price rises by the full amount of the tax, buyers pay the tax.
- If the price rises by a lesser amount than the tax, buyers and sellers share the burden of the tax.
- If the price doesn't rise at all, sellers pay the tax

A tax on buyers shifts the D curve down by the amount of the tax.

P would have to fall by $ 1.50 to make buyers willing to buy same Q as before

A Tax on Buyers

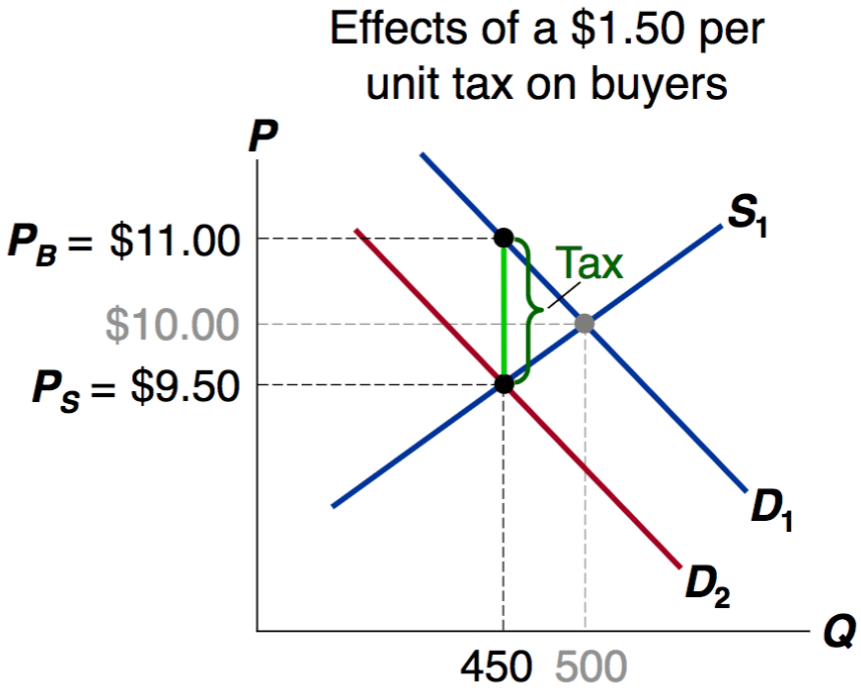
New eq'm:

$Q = 450$

Sellers receive $P_S = \$9.50$

Buyers pay $P_B = \$11.00$

Difference between them = \$1.50 = tax



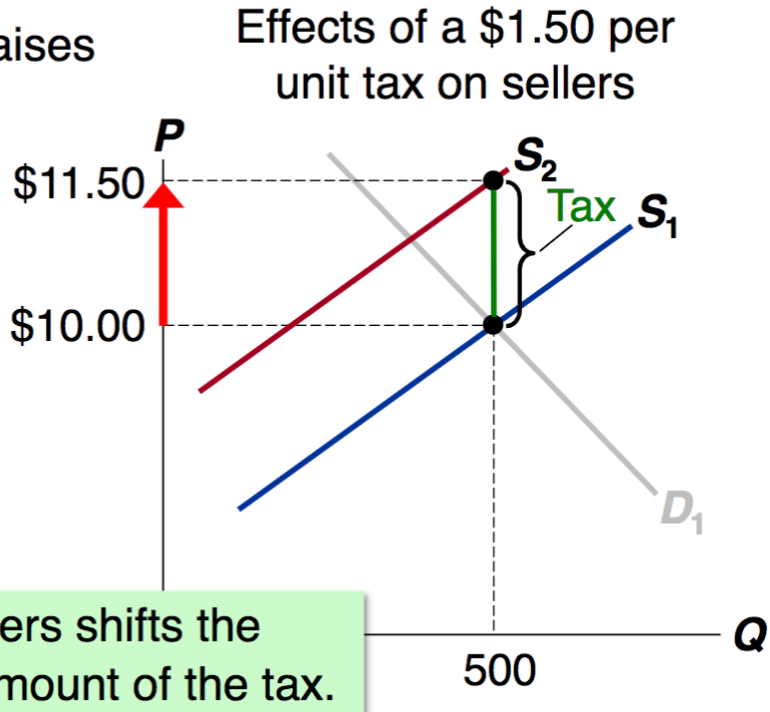
The `incidence` of a Tax: how the burden of a tax is shared among market participants

The tax effectively raises sellers' costs by \$ 1.50 per pizzas only if P rises to \$ 1.50 to compensate for this cost increase.

A Tax on Sellers

The tax effectively raises sellers' costs by \$1.50 per pizza.

Sellers will supply 500 pizzas only if P rises to \$11.50, to compensate for this cost increase.



Hence, a tax on sellers shifts the S curve up by the amount of the tax.

The outcome is the same in both cases! The effects on P and Q, and the tax incidence are the same weather the tax is imposed on buyers or sellers.

A tax drives a wedge between the price buyers pay and the price sellers receive.

What factors have impact on the tax incidence? Elasticity!

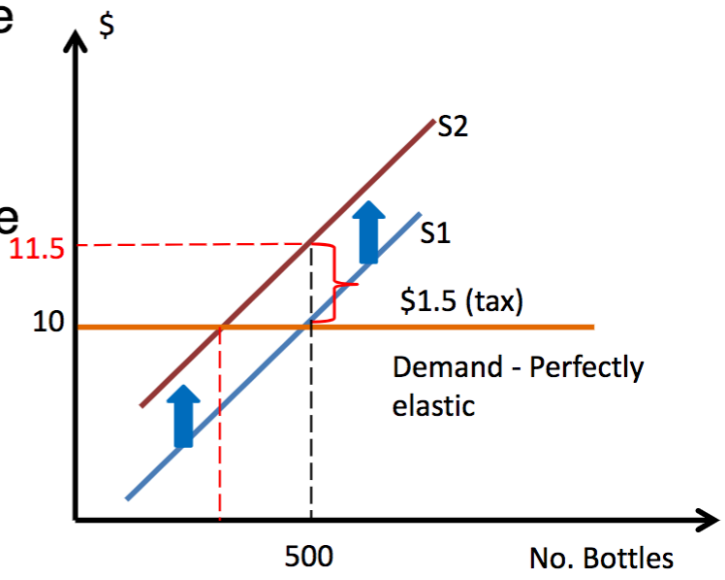
Elasticity and Tax Incidence

Special Case: Perfectly Elastic Demand:

- Tax on sellers, how the sales tax burden be divided?

Sellers pay ALL tax

- The result will be the same if tax is levied on Buyers



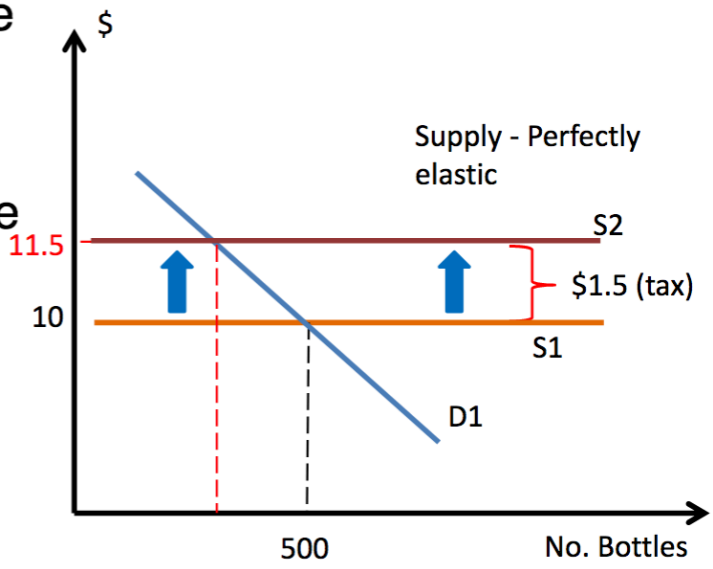
Elasticity and Tax Incidence

Special Case: Perfectly Elastic Supply:

- Tax on sellers, how the sales tax burden be divided?

Buyers pay ALL tax

- The result will be the same if tax is levied on Buyers



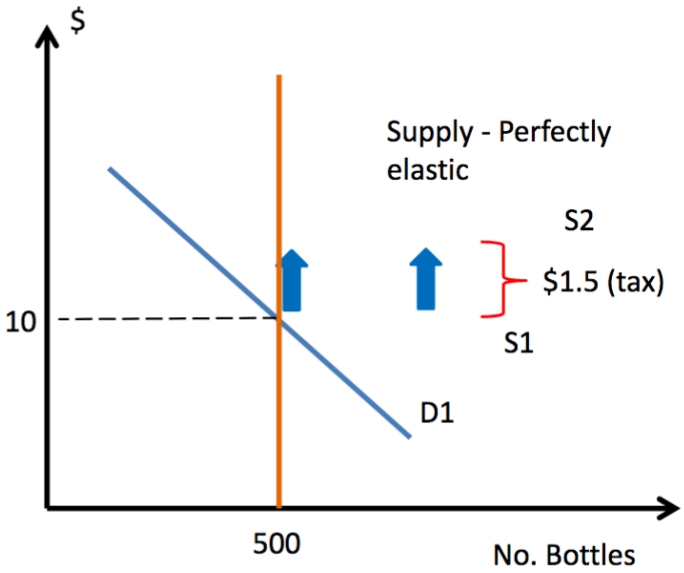
Elasticity and Tax Incidence

Special Case: Perfectly Inelastic Supply:

- Tax on sellers, how the sales tax burden be divided?

Sellers pay ALL tax

- The result will be the same if tax is levied on Buyers



Supply is more elastic than demand

It is easier for sellers than buyers to leave the market. So buyers bear most of the burden of the tax.

Demand is more elastic than supply

It is easier for buyers than sellers to leave the market. Sellers bear most of the burden of the tax.

Who pays the luxury tax?

Demand is price-elastic. In short run, supply is inelastic.

Active Learning 3

As long as labor supply and labor demand both have price elasticity > 0, the tax cut will be shared by workers and employers, i.e, workers' take-home pay will rise less than 2%

Who gets the bigger share of this tax cut, workers or employers? How do elasticities determine the answer?

Each of the policies in this chapter affects the allocation of society's resources.

Example 1: A tax on pizza reduces equilibrium Q. With less production of pizza, resources will become available to other industries.

Example 2: A binding minimum wage causes a surplus of workers, a waste of resources

Hence, it is important for policymakers to apply such policies very carefully

Summary

A price ceiling is a legal maximum on the price of a good. An example is rent control. If the price ceiling is below the eq'm price, it is binding and causes a shortage.

A price floor is a legal minimum on the price of a good. An example is the minimum wage. If the price floor is above the eq'm price, it is binding and causes a surplus. The labor surplus caused by the minimum wage is unemployment.

A tax on a good places *a wedge between the price buyers pay and the price sellers receive*, and causes the equilibrium quantity to fall, whether the tax is imposed on buyers or sellers.

The incidence of a tax is the division of the burden of the tax between buyers and sellers, and does not depend on whether the tax is imposed on buyers or sellers.

The incidence of the tax depends on the price elasticities of supply and demand.

Oct 26

More efficient, achieve equality

Active learning 3: trade-off between fairness and equity

Excercises: d. c.

Chapter 13 The Costs of Production

Total Revenue, Total Cost, Profit

We assume that the firm's goal is to maximize profit

Profit = Total Revenue - Total Cost

Costs are always "`economic costs`"

Economic Profits vs. Accounting Profits

Factor of production owned or provided by firm or entrepreneur. If the firm own capital and uses it to produce its output, then the firm incurs an opportunity cost.

If the firm own capital and uses it to produce its output, then the firm incurs an opportunity cost. Because the firm can receive compensation or income by selling or renting the capital to other firms.

In economics, we have only one cost - opportunity cost, which includes:

- `explicit costs` require an outlay of money, e.g., paying wages to workers
- `implicit costs` do not require a cash outlay, e.g., opportunity cost of the owner's time

`Accounting profit` = total revenue - total explicit costs

`Economic profit` = total revenue - total costs (including explicit and implicit costs)

The Production Function

shows the relationship between the quantity of inputs used to produce a good an the quantity of output of that good. It can be represented by a table, equation, or graph.

The `marginal product` of any input is the increase in output arising from an additional unit of that input, holding all other inputs constant.

$\Delta Q =$ change in output, $\Delta L =$ change in labor, MPL $= \frac{\Delta Q}{\Delta L}$.

MPL Marginal Product of Labor = slope of production function

Rational people think at the margin

Comparing them helps Jack decide whether he should hire the (marginal) worker

Why MPL diminishes?

As Jack adds workers, the average worker has less land to work with and will be less productive.

In general, MPL diminishes as L rises; whether the fixed input is land or capital (equipment, machines)

Diminishing marginal product: The marginal product of an input declines as the quantity of the input increases. (Other things equal)

`Fixed Costs` FC does not vary with the quantity of output produced.

Cost of equipment, loan payments, rent, land

`Variable costs` VC varies with the quantity produced

Cost of materials, wages he pays workers

`Total costs` TC = FC + VC

`Total Cost Curve` Total cost over quantity of output

`Marginal Cost` MC is the increase in Total Cost from producing one more unit MC $= \frac{\Delta TC}{\Delta Q}$

Why is marginal cost important?

Farmer Jack is rational and wants to maximize his profit. To increase profit, should he produce more or less wheat? Farmer Jack needs to "think at the margin".

If the cost of additional wheat (MC) is less than the revenue he would get from selling it then Jack's profits rise if ht produces more.

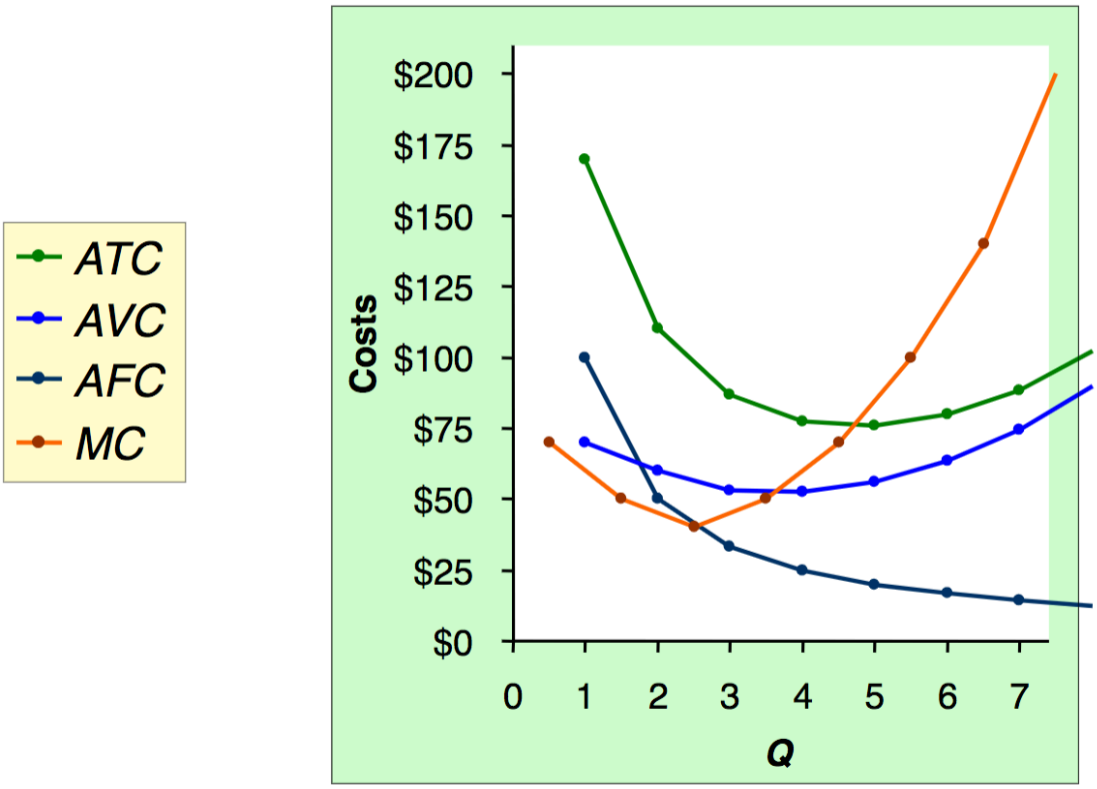
A more general example that applies to any type of firm producing any good with any types of inputs.

`Average Fixed Cost` (AFC)

`Average Variable Cost` (AVC)

`Average Total Cost` ATC = TC/Q = AFC + AVC

EXAMPLE 2: The Various Cost Curves Together



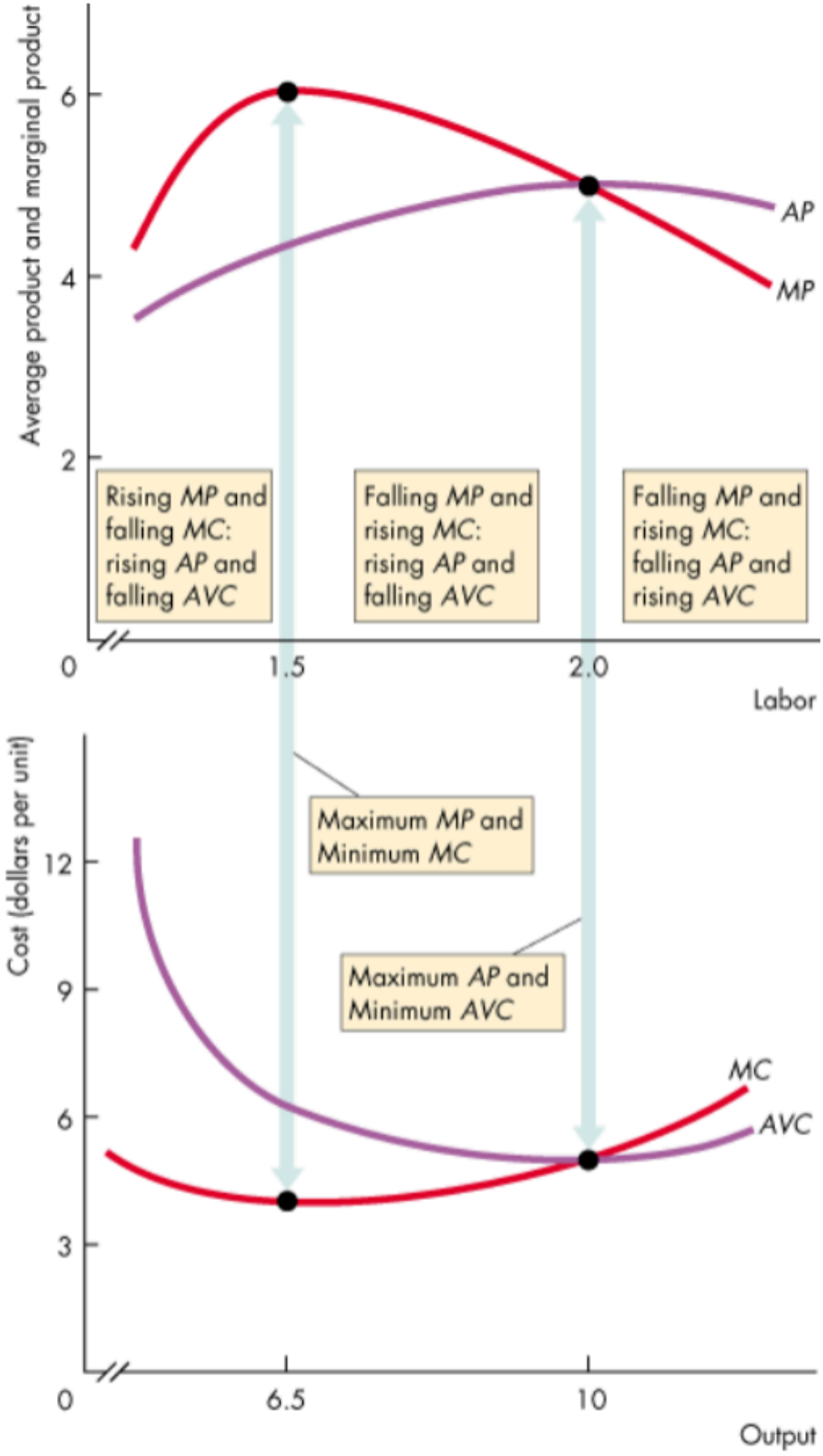
Why is ATC U-shaped?

As Q rises, initially, falling AFC pulls ATC down . Eventually, rising AVC pulls ATC up.

`Efficient scale`: The quantity that minimizes ATC.

When MC < ATC, ATC is falling and when MC > ATC, ATC is rising

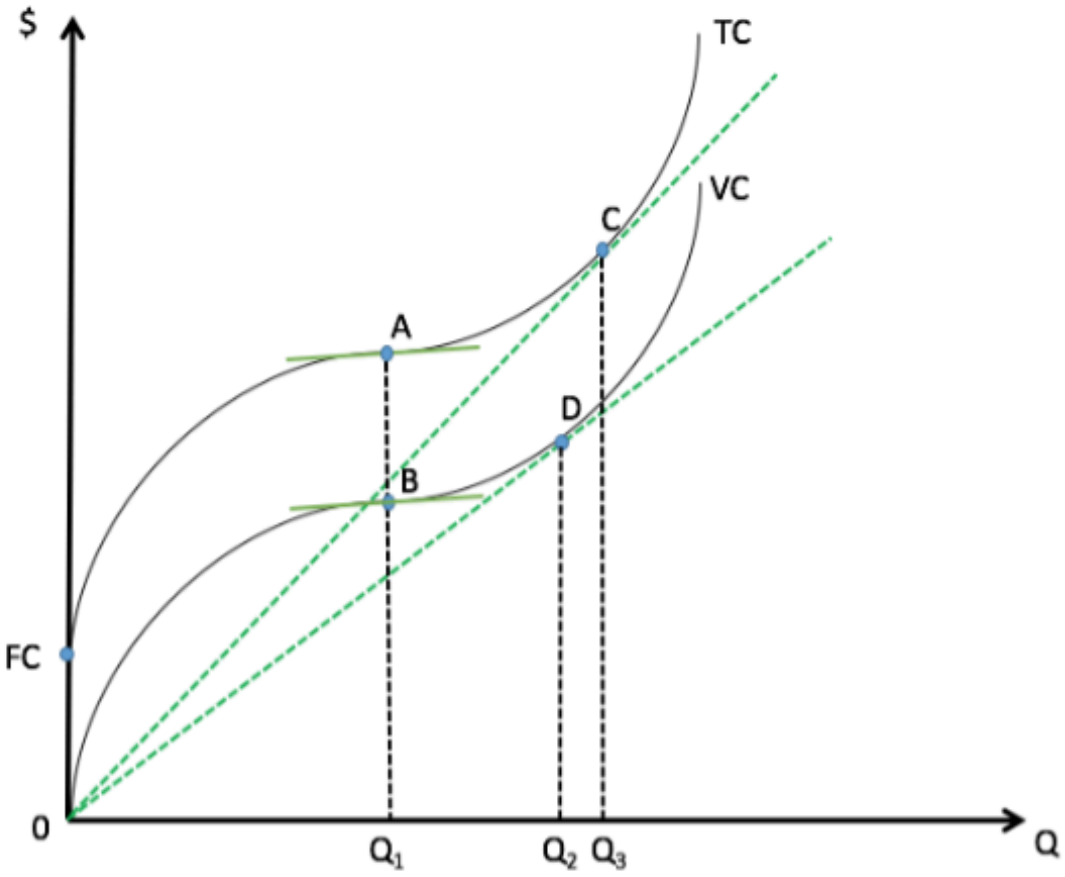
The MC curve crosses the ATC curve at the ATC curve's minimum

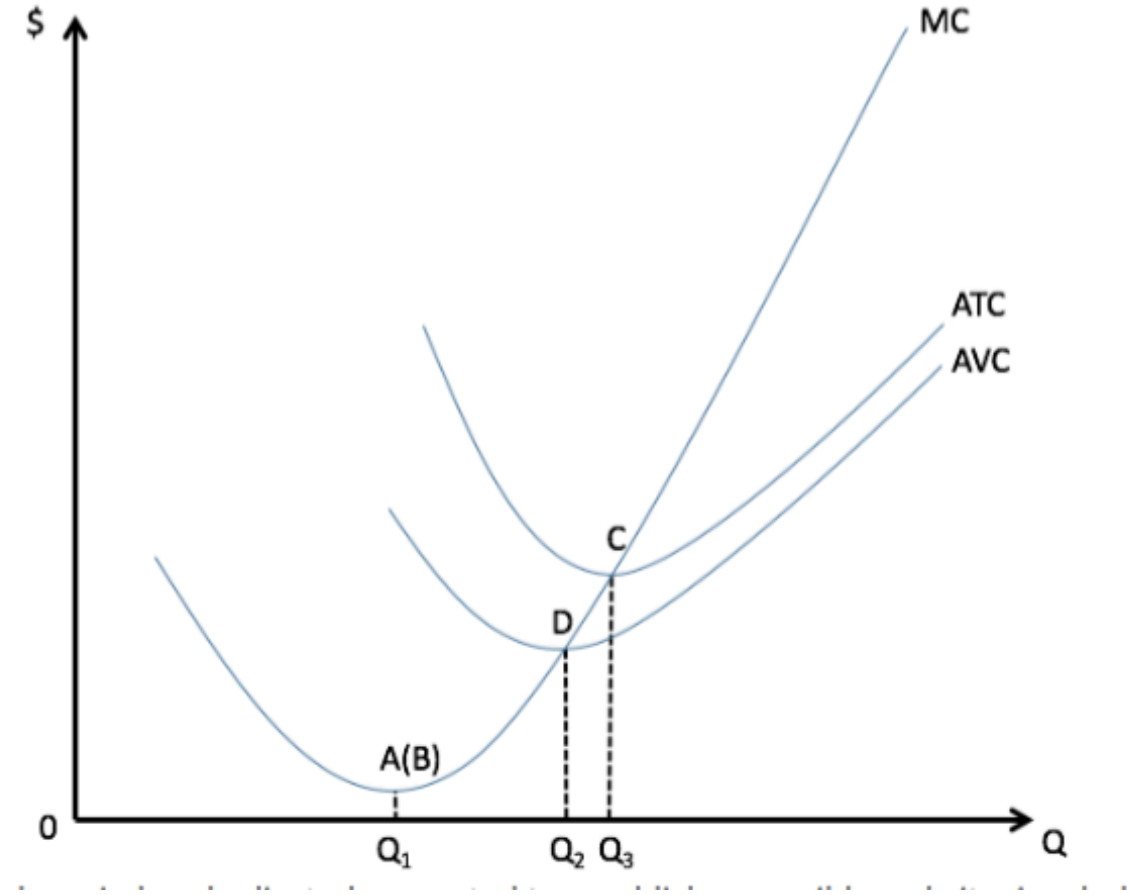


MC and AC in a graph (`Total Cost Graph`)

MC of the xth unit: represented by the slope

AC of the xth unit: represented by the slope (Slope the line connected the origin and the point represents the total cost of xth units tangent line)





Costs in the Short Run & Long Run

Short run: some inputs are fixed (e.g., factories, land) The costs of these inputs are FC

Long run: all inputs are variable (e.g., firms can build more factories or sell existing ones)

In the long run, ATC at any Q is cost per unit using the most efficient mix of inputs for that Q. (e.g. the factory size with lowest ATC)

Long-Run Cost

Table 1 shows a firm's production function. As the size of the plant increases, the output that a given quantity of labor can produce increases. But for each plant, as the quantity of labor increases, diminishing returns occur.

The average cost of producing a given output varies and depends on the firm's plant. The larger the plant, the greater is the output at which ATC is at a minimum. Each plant has a short-run ATC curve. The firm can compare the ATC for each output at different plants.

The `long-run average cost curve` is made up from the lowest ATC for each output level. We need to decide which plant has the lowest cost for producing each output level.

The long-run average cost curve is the relationship between the lowest attainable average total cost and output when both plant and labor are varied.

The LRAC curve is a planning curve that tells the firm the plant that minimizes the cost of producing a given output. Once the firm has chosen its plant, the firm incurs the costs that correspond to the ATC curve for that plant.

How ATC changes as the scale of production changes?

`Economies of scale`: ATC falls as Q increases.

occurs when increasing production allows greater specialization: workers are more efficient when focusing on a narrow task. More common when Q is low.

`Constant returns to scale`: ATC stays the same as Q increases.

`Diseconomies of scale`: ATC rises as Q increases.

Due to coordination problems in large organizations. E.g., management becomes stretched, cannot control costs. More common when Q is high.

Summary

Implicit costs do not involve a cash outlay, yet are just as important as explicit costs to firms' decisions.

Accounting profit is revenue minus explicit costs. Economic profit is revenue minus total (explicit + implicit) costs.

The production function shows the relationship between outputs and inputs.

The marginal product of labor is the increase in output from a one unit increase in labor, holding other inputs constant. The marginal products of other inputs are defined similarly.

Marginal product usually diminishes as the input increases. Thus, as output rises, the production function becomes flatter and the total cost curve becomes steeper.

Variable costs vary with output; fixed costs do not.

Marginal cost is the increase in total cost from an extra unit of production. The

MC curve is usually upward-sloping.

Average variable cost is variable cost divided by output.

Average fixed cost is fixed cost divided by output. AFC always falls as output increases.

Average total cost ("cost per unit") is total cost divided by the quantity of output. ATC curve is usually U-shaped.

The MC curve intersects the ATC curve at minimum average total cost. When MC < ATC, ATC falls as Q rises. When MC > ATC, ATC rises as Q rises.

In the long run, all costs are variable.

Nov 2

P15

Why MPL diminishes?

In general, MPL diminishes as L rises; whether the fixed input is land or capital (equipment, machines, etc).

`Diminishing Marginal Product` The marginal product of an input declines as the quantity of the input increases.

MC is an increasing function

MPL decrease: each additional worker produces less and less output

MC increase: each additional output requires more and more workers. incurs higher and higher MC

TC increase as Q increase at an increasing rate

Why MC is important?

Think at the margin

If the cost of additional wheat is less than the revenue he would get from selling it, then Jack's profits rise if he produces more.

Example 1:

Total Product curve is concave, diminishing marginal return, MPL $\downarrow$

Marginal Cost curve, increasing

Example 2:

Marginal Product Curve bell shape, Peak of marginal product take place

Shape of total product curve is convex and then becomes concave

Total cost curve starts from a positive value

Total cost curve first concave and the convex

Average Fixed Cost: reciprocal function

Average Variable Cost: VC/Q

TP vs TC(VC)

$L \times w = VC$

Chapter 6&8 Part II Oct 26

Tax is included in total surplus because tax revenue can fund beneficial services (e.g. education, roads, police).

`Deadweight loss` results from a market distortion such as a tax.

The value of these units to buyers is greater than the cost of producing them, so the tax prevents some mutually beneficial trades.

Which goods or services should government tax to raise the revenue it needs?

One answer is those with the smallest DWL

What determines the size of DML?

Price elasticities of supply and demand

(Fix Demand)

When supply is inelastic, it is harder for firms to leave the market when tax reduces P_s. So, the tax only reduces Q a little, and DWL is small.

The more elastic is supply, the easier for firms to leave the market when the tax reduces P_s, the greater Q falls below the surplus-maximizing quantity, the greater the DWL.

When demand is inelastic, it's harder for consumers to leave the market when the tax raises P_B. So, the tax only reduces Q a little and DWL is small.

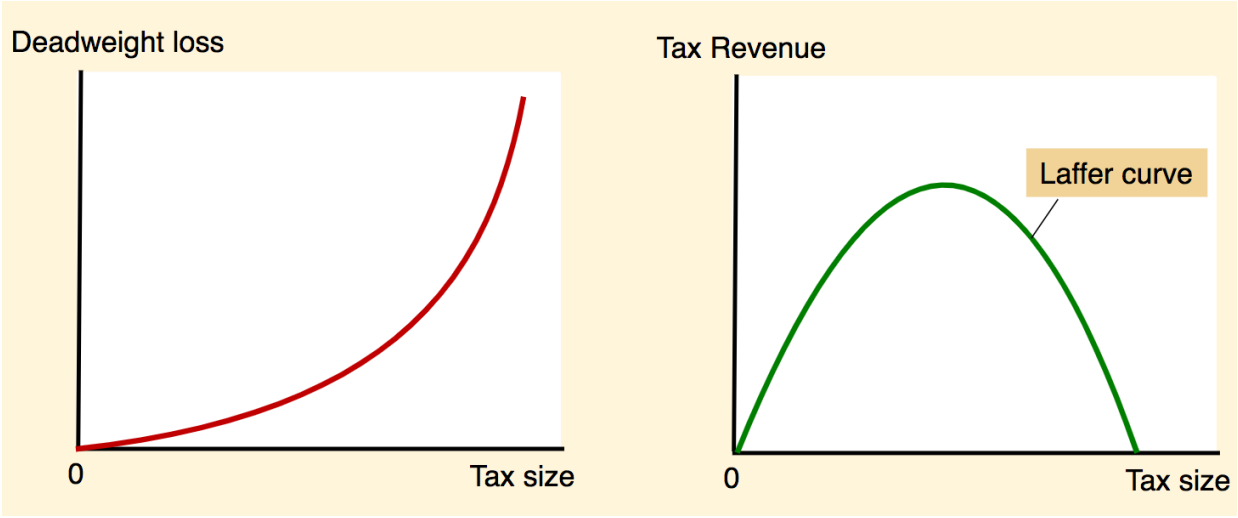
The more elastic is demand, the easier for buyers to leave the market when the tax increases P_B, the more Q falls below the surplus-maximizing quantity, and the greater the DWL.

How big should the government be?

A bigger government provides more services, but requires higher taxes, which cause DWLs. The larger the DWL from taxation, the greater the argument for smaller government.

The tax on labor income is especially important; it is the biggest source of government revenue. If labor supply is inelastic, then DWL is small. Some economists believe labor supply is inelastic, arguing that most workers work full-time regardless of the wage.

Policymakers often change taxes, raising some and lowering others. What happens to DWL and tax revenue when taxes change?



Summary

A tax on a good reduces the welfare of buyers and sellers. This welfare loss usually exceeds the revenue the tax raises for the government.

The fall in total surplus (consumer surplus, producer surplus, and tax revenue) is called the deadweight loss (DWL) of the tax.

A tax has a DWL because it causes consumers to buy less and producers to sell less, thus shrinking the market below the level that maximizes total surplus.

The price elasticities of demand and supply measure how much buyers and sellers respond to price changes. Therefore, higher elasticities imply higher DWLs.

An increase in the size of a tax causes the DWL to rise even more.

An increase in the size of a tax causes revenue to rise at first, but eventually revenue falls because the tax reduces the size of the market.

Other Elasticities Chapter 5

Some Notes:

How price elasticity of supply can vary?

Supply often becomes less elastic as Q rises due to capacity limits.

`Cross-price elasticity of demand`:

measures the response of demand for one good to changes in the price of another good

Cross-price elasticity of demand = % change in Q^d for good 1 / % change in price of good 2

For substitutes, cross-price elasticity > 0 (e.g. an increase in price of beef causes an increase in demand for chicken).

For complements, cross-price elasticity < 0 (e.g. an increase in price of computers causes decrease in demand for software)

`Income elasticity of demand`: measures the response of Q^d to a change in consumer income

Income elasticity of demand = percentage change in Q^d / Percentage change in income

For normal goods, income elasticity > 0. For inferior goods, income elasticity < 0

Application: Does Drug interdiction increase or decrease drug-related crime?

Interdiction vs. Education

`Price elasticity of supply`

percentage change in Q^s / percentage change in P

Loosely speaking, it measures sellers' price-sensitivity. Use the midpoint method to compute the percentage changes.

The slope of the supply curve is closely related to price elasticity of supply.

Rule of thumb: The flatter the curve, the bigger the elasticity; The steeper the curve, the smaller the elasticity

The Determinants of Supply Elasticity

The more easily sellers can change the quantity they produce, the greater the price elasticity of supply.

Example: Supply of beachfront property is harder to vary and thus less elastic than supply of new cars.

For many goods, price elasticity of supply is greater in the long run than in the short run, because firms can build new factories, or new firms may be able to enter the market.

Supply often becomes less elastic as Q rises, due to capacity limits.

Summary

Demand is less elastic in the short run, for necessities, for broadly defined goods, and for goods with few close substitutes.

Price elasticity of supply equals percentage change in Q^s divided by percentage change in P.

When it is less than one, supply is "inelastic". When greater than one, supply is "elastic".

Midterm 2

- [ ] Chapter 5 problems from the book
- [x] Chapter 6 problems
- [x] Chapter 7 problems
- [x] Chapter 8 problems
- [ ] Chapter 13 problems from the book

- [ ] HW2
- [x] Quiz 5

- [ ] How to explain new market price?
- [ ] The effect of tax
- [ ] Demand Schedule
- [ ] What happens at non-competitive market

When tax is imposed, it drives a `wedge` of $ 2 between supply and demand. The difference between the price paid by consumers and the price received by producers is the $ 2 tax. The quantity of beer sold declines.

Raising the payroll tax paid by firms and using part of the extra revenue to reduce the payroll tax paid by workers would not make workers better off, because the division of burden of a tax depends on the elasticity of supply and demand and not on who must pay the tax. Because the tax wedge would be larger, it is like that both firms and workers, who share the burden of any tax, would be worse off.

The increase in quantity increases producer surplus, while the decline in the price reduces producer surplus.

The price paid by consumers rises, unless demand is perfectly elastic or supply is perfectly inelastic.

Nov 23

Single Price Monopoly

P24

Economic Profit for single price monopoly (Area)

Do you have marginal cost curve? In this case, MCC is constant. And then this is ATC.

For the different number of buyers. Group one and group two. One has higher WTP than the second group.

G1 - high WTP P1

G2 - Low WTP P2 = PM

G3 - with even lower WTP P3 Without hurting economic profit earned by previous buyers

Perfect Price Discrimination

Is there any CS left? no

WTP = P_1, WTF[P-3]

If this PC, what can be market outcome?

This is efficient P26

What is wrong? You need to consider the eq'm as well. This is not fair for all of the buyers.

MR < P.

How to compare for perfect price discrimination monopoly.

You can always sell the next unit at the lower price. For every additional unit sold,

In this situation, marginal revenue curve is the demand curve.

You can also verify using the table.

3 degree price discrimination: discriminate among groups of buyers. races, goods, gender. Elasticity is the ultimate reason of the supply and demand.

2 degree price discrimination: discriminate among units of a good sold.

Reading Textbook P306

P307 2nd degree

Regulation of monopoly market. Regulate the market leads to smaller size of dwl

Price regulation comes with subsidy

AC = P_R Regulated price level Q_R

Economic Performance

DWL is still positive but it is smaller than situation without regulation. pi = 0

Read Textbook P310

Chapter 14 Firms in Competitive Markets

Characteristics of Perfect Competition

- Many buyers and many sellers
- The goods offered are largely the same
- Firms can freely enter or exit the market

1&2 tells that each buyer and seller is a `price taker`

Firm can choose to quit market both in the short run and long run.

The Revenue of a Competitive Firm

Total Revenue $TR = P \times Q$

Average Revenue $AR = TR/Q = P$

(For a competitive firm, $AR = P$)

Marginal Revenue $MR = \frac{\Delta TR}{\Delta Q}$

(The change in TR from selling one more unit)

A competitive firm can keep increasing its output without affecting the market price.

Hence, each one-unit increase in Q causes revenue to rise by P, i.e., MR = P = AR

$MR = P$ is only true or firms in competitive markets.

Profit Maximization

What Q maximizes the firms' profit?

If Q increases by one unit, revenue rises by MR, cost rises by MC.

If MR > MC, then increase Q to raise profit. If MR < MC, then reduce Q to raise profit.

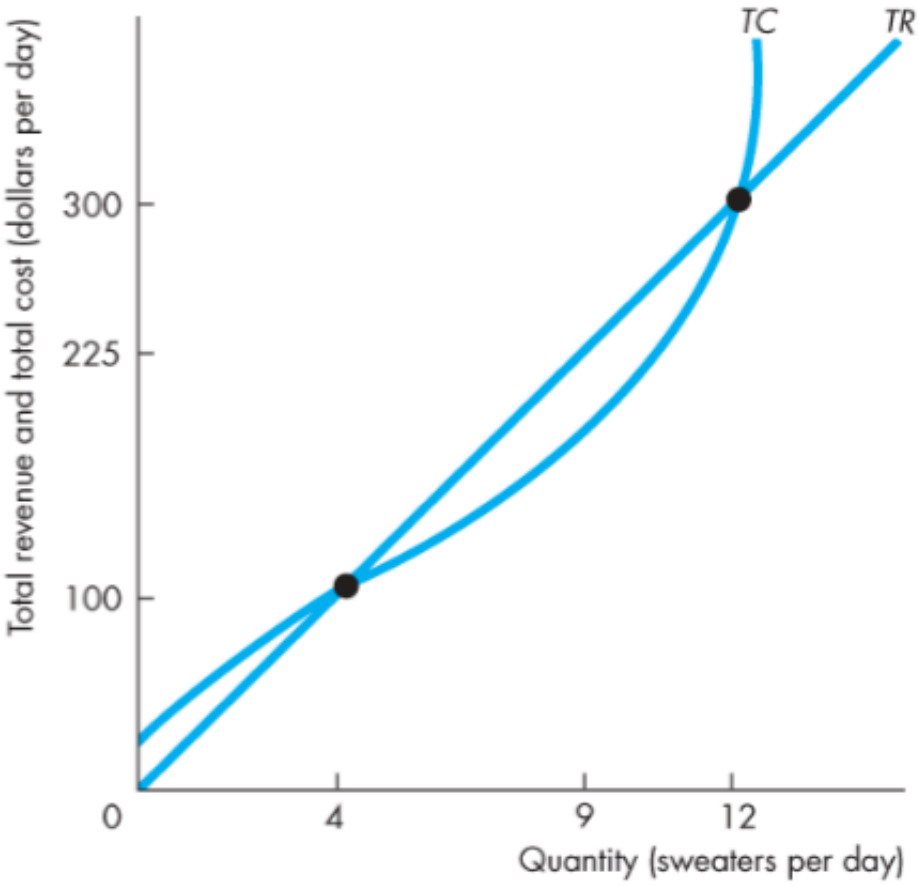
At equilibrium, $MR = MC$ (Golden rule)

(Know what MC curve looks like)

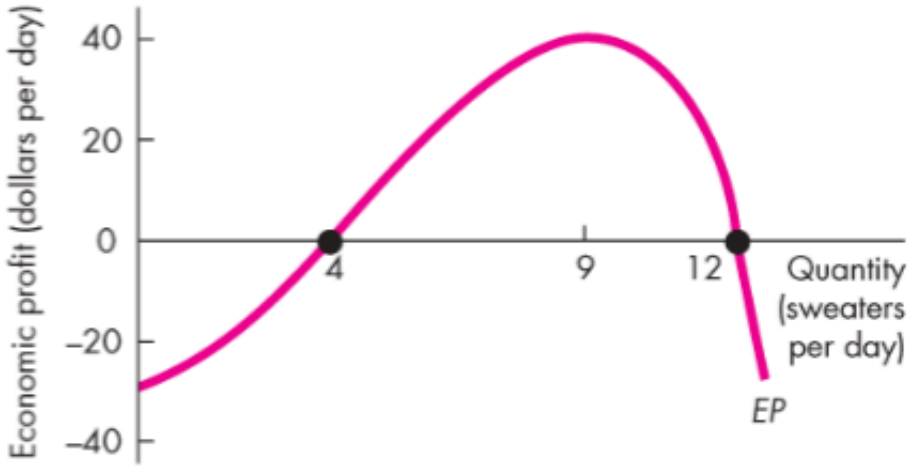
If price rises to P_2, then the profit maximizing quantity rises to Q_2. The MC curve determines the firm's Q at any price. MC curve is the firm's supply curve.

From another perspective: TR and TC

TR - MC = economic profit



(a) Revenue and cost



(b) Economic profit and loss

Shutdown vs Exit

`Shutdown` a short-run decision not to produce anything because of market conditions.

`Exit` a long-run decision to leave the market

Key difference:

- If shut down in SR, must still pay FC.
- If exit in LR, zero costs.

The Irrelevance of Sunk Costs

`Sunk Cost`: A cost that has already been committed and cannot be recovered.

Sunk costs she be irrelevant to decision

FC is sunk cost: The firm must pay its fixed costs whether it produces or shuts down.

FC should not matter in the decision to shut down

A Firm's Short-run Decision to Shut Down

Giving up: Revenue = TR

Saving: Variable Costs

Benefit of shutting down: cost savings = VC

Shut down if TR < VC

Divide both sides by Q: $P < AVC$

Decision rule: Shut down if P < AVC

Profits and Losses in the Short Run:

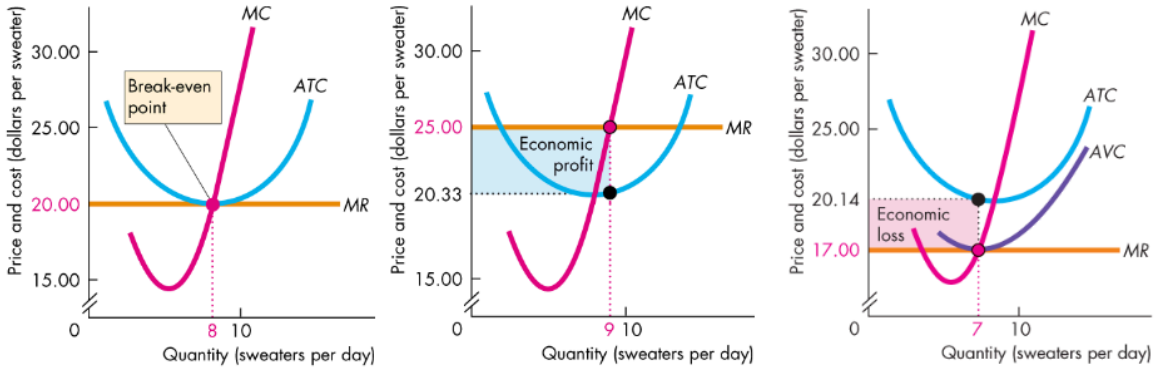
- Maximum profit is not always a positive economic profit.
- To see if a firm is making a profit or incurring a loss compare the firm's ATC at the profit-maximizing output with the market price. (ATC vs P)

A Firm's Short-run Decision to Shut Down

In part (a) price *equals* average total cost and the firm makes zero economic profit (breaks even).

In part (b), price *exceeds* average total cost and the firm makes a positive economic profit.

In part (c) price is *less than* average total cost and the firm incurs an economic loss—economic profit is negative.



[Ask question about the third figure] The firm incurs a loss equal to the red rectangle.

The Shutdown Point

A firm's shutdown point is the price and quantity at which it is *indifferent* between producing the profit-maximizing quantity and shutting down.

- The shutdown point is at minimum AVC
- This point is the same point at which the MC curve crosses the AVC curve.
- At the shutdown point, the firm is indifferent between producing and shutting down temporarily.
- At the shutdown point, the firm incurs a loss equal to total fixed cost (TFC)

A Firm's Long-run Decision to Exit

- Cost of exiting the market: revenue loss = TR
- Benefit of exiting the market: cost saving = TC (zero FC in the long run)
- Firm exits if $TR < TC$
- Divide both sides by Q to write the firm's decision rule as: Exit if $P < ATC$

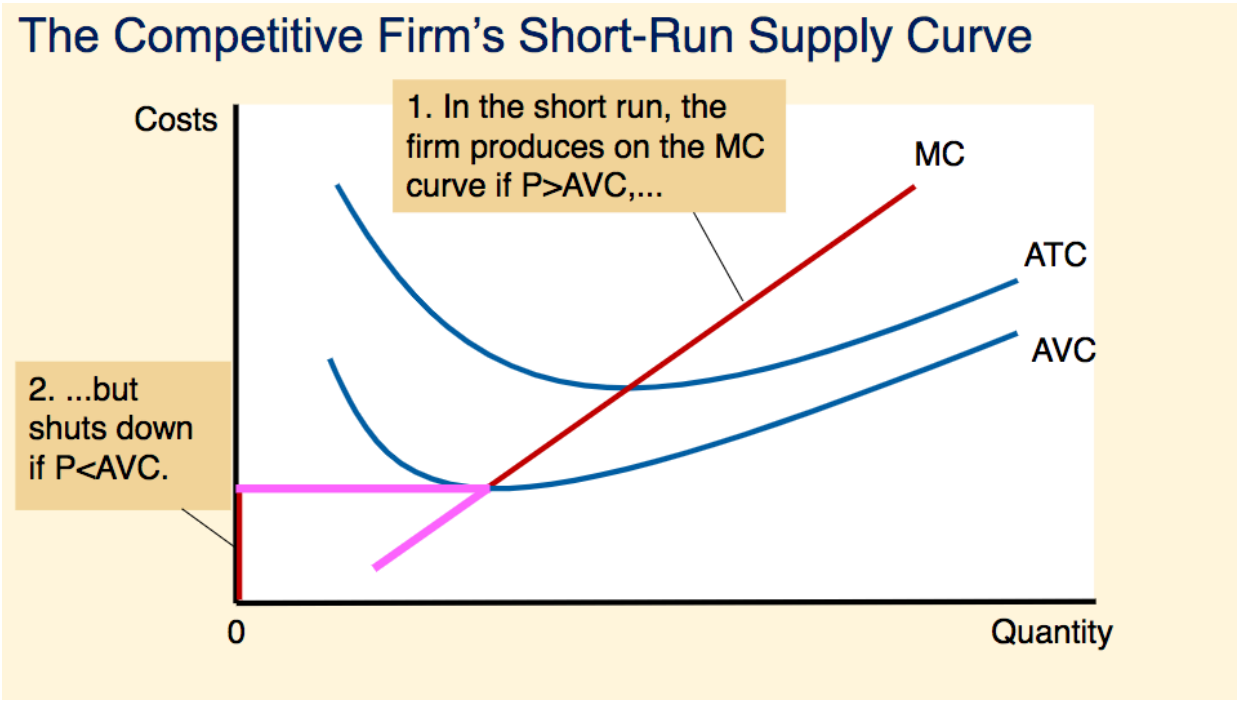
A New Firm's Decision to Enter Market

- In the long run, a new firm will enter the market if it is profitable to do so: if TR > TC.
- Divide both sides by Q to express the firm's entry decision as: Enter if P > ATC

The SR Market Supply Curve

As long as $P \geq AVC$, each firm will produce its profit-maximizing quantity, where $MR = MC$.

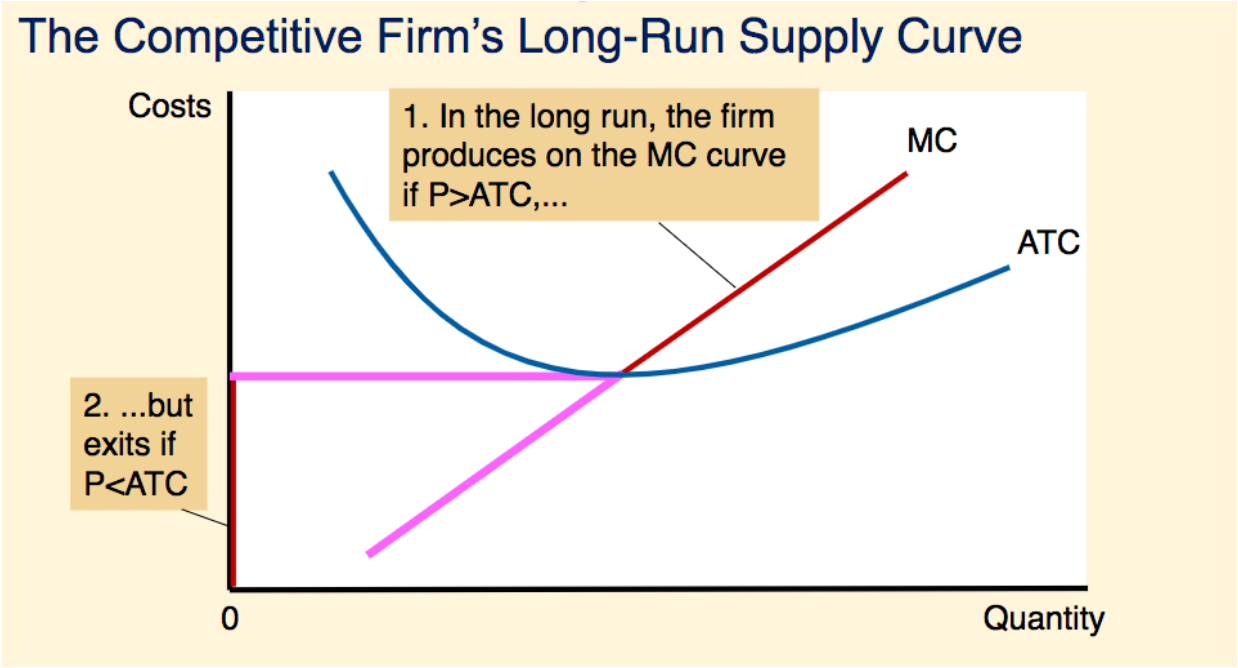
At each price, the market quantity supplied is the sum of quantities supplied by all firms.



In the short run, the competitive firm's supply curve is its marginal-cost curve (MC) above the average variable cost (AVC). If the price falls below average variable cost, the firm is better off shutting down temporarily.

Suppose 1000 identical firms

At each P, market Q^s = $1000\times$ (one firm's Q^s)



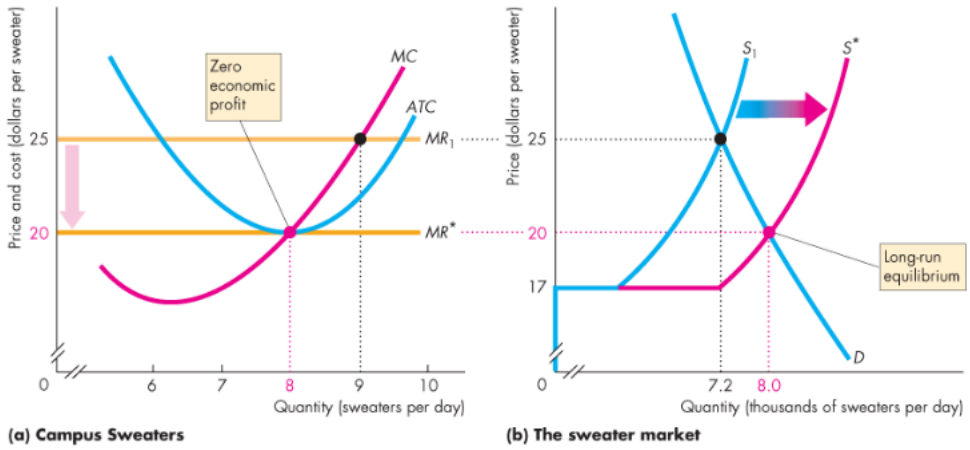
In the long run, the competitive firm's supply curve is its marginal-cost curve (MC) above the average total cost (ATC). If the price falls below average total cost, the firm is better off exiting the market.

Market Supply: Assumptions

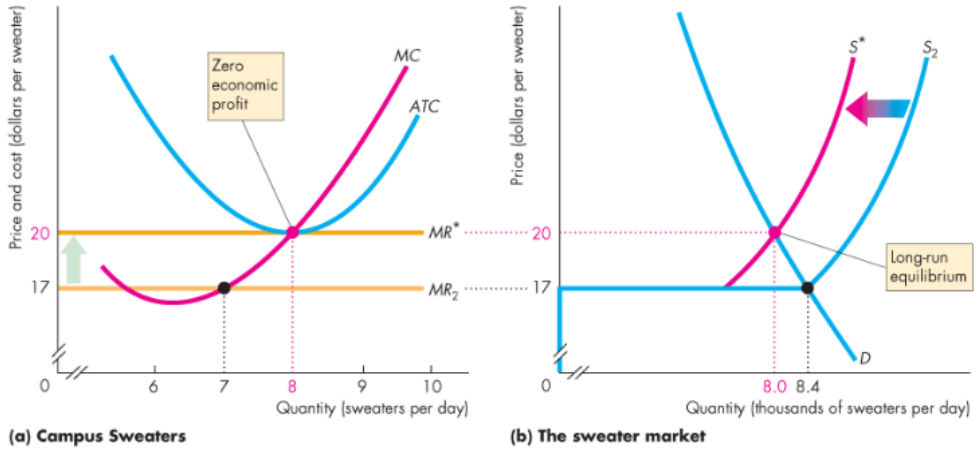
- All existing firms and potential entrants have identical costs
- Each firm's costs do not change as other firms enter or exit the market
- The number of firms in the market is
    - Fixed in the short run, due to fixed costs
    - Variable in the long run, due to free entry and exit

Entry & Exit in the Long Run

- In the LR, the number of firms can change due to entry & exit
- If exists firms ear positive economic profit,
    - new firms enter, SR market supply shifts right
    - P falls, reducing profits and slowing entry
- If existing firms incur losses,
    - some firms exit, SR market supply shifts left
    - P rises, reducing remaining firms' losses



In the LR, the market price falls until firms are making zero economic profit.



In the LR, the market price continues to rise until firms make zero economic profit.

[What does 17 means in the above figures?]

`The zero-profit condition`

Long-run Equilibrium

- The process of entry or exit is complete - remaining firms earn zero economic profit.
- Zero economic profit occurs when $P = ATC$
- Since firms produce where $P = MR = MC$, the zero profit condition is $P = MC = ATC$
- MC intersects ATC at minimum ATC
- In the long run, $P = \text{minimum } ATC$

Why do firms stay in business if profit = 0?

Economic profit is revenue minus all costs, including implicit costs like the opportunity cost of the owner's time and money.

In the zero-profit equilibrium,

- firm earn enough revenue to cover these costs
- accounting profit is positive

In the long run, the typical firm earns zero profit. The LR market supply curve is horizontal at $P = \min ATC$.

A firm begins in long-run eq'm, but then an increase in demand raises P. Overtime, profits induce entry, shifting S to the right, reducing P; leading to SR profits for the firm. driving profits to zero and restoring long-run eq'm.

Why the LR supply curve might slope upward?

- The LR market supply curve is horizontal if
    - All firms have identical costs, and
    - costs do not change as other firms enter or exit the market
- If either of these assumptions is not true, then LR supply curve slopes upward.

We know,

- Firms have different cost
    - As P rises, firms with lower costs enter the market before those with higher costs.
    - Further increases in P make it worthwhile for higher-cost firms to enter the market, which increases market quantity supplied.
    - Hence, LR market supply curve slopes upward.
    - At any P,
        - For the marginal firm, P = minimum ATC and profit = 0
        - For lower-cost firms, profit > 0
- Costs rise as firms enter the market
    - In some industries, the supply of a key input is limited (amount of land suitable for farming is fixed)
    - The entry of new firms increases demand for this input, causing its price to rise.
    - This increases all firms' costs.
    - Hence, an increase in P is required to increase the market quantity supplied, so the supply curve is upward-sloping.

Conclusion

The efficiency of a Competitive Market:

- Profit Maximization: MC = MR
- Perfect Competition: P = MR

- In competitive eq'm: P = MC

MC is cost of producing the marginal unit. P is value to buyers of the marginal unit.

The competitive eq'm is efficient, maximizes total surplus.

Summary

For a firm in a perfectly competitive market, P = MR = AR

If P > AVC, a firm maximizes profit by producing the quantity where MR = MC. If P < AVC, a firm will shut down in the short run.

If P < ATC, a firm will exit in the long run.

In the short run, entry is not possible, and an increase in demand increases firms' profits.

With free entry and exit, profits = 0 in the long run, and P = minimum ATC.

Monopoly

A `monopoly` is a firm that is the sole seller of a product without close substitutes.

A monopoly firm has `market power`, the ability to influence the market price of the product it sells. A competitive firm has no market power.

How monopoly arises?

- One firm
- Unique product
- Blocked entry
- Market power-price maker

Why monopoly arises?

The main cause of monopolies is `barriers to entry`

Three sources:

- A single firm owns a key resource. (e.g. DeBeers owns most diamond mines.)
- The government gives a single firm the exclusive right to produce the good. (e.g. patents, copyright laws)
- `Natural Monopoly`: a single firm can produce the entire market Q at lower cost than could several firms. (e.g. 1000 homes need electricity)

For electricity, ATC slopes downward due to huge FC and small MC.

ATC is lower if one firm services all 1000 homes than if two firms each service 500 homes.

Monopoly vs. Competition: Demand Curves

In a competitive market, the market demand curve slopes downward.

But the demand curve for any individual firm's product is horizontal at the market price. The firm can increase Q without lowering P and hence $MR = P$ for the competitive firm.

A monopolist is the only seller, so it faces the market demand curve. To sell a larger Q, the firm must reduce P. Thus $MR \neq P$.

Increasing Q has two effects on revenue:

- Output effect: higher output raises revenue
- Price effect: lower price reduces revenue

To see a larger Q, the monopolist must reduce the price on all the units it sells.

Hence, MR < P.

MR could even be negative if the price effect exceeds the output effect.

MR < P, for a single price monopoly as selling one more unit, price has to be reduced.

Not only the price for that additional unit, but for all units.

What is MR for a competitive firm? P= MR

Profit-Maximization

Though a monopolist's MR is different from that of a competitive firm. MR = MC is still the condition for finding its profit maximizing Q (Q_M). However, the determination of P would be different. It finds the price P_M from the D curve.

- The profit-maximizing Q is where MR = MC.
- Find P from the demand curve at this Q.
- Find ATC from ATC curve at this Q.

The monopolist's profit equals $(P - ATC) \times Q$

How P and Q different from perfect competition? $Q_M < Q^*$ and $P_M > P^*$.

A monopoly does not have an S curve

A competitive firm takes P as given and has a supply curve that shows how its Q depends on P .

A monopoly firm is a "price-maker", not a price-taker. Q does not depend on P. Q and P are jointly determined by MC, MR and the demand curve.

Monopoly's MR is related to the elasticity of demand (linear).

Demand: P = a - bQ, $TR = P \times Q$, $MR = a - 2bQ$

Even MC = 0, Q_M will be at the mid-point of demand curve, where elasticity = 1.

If MC > 0? [Ask this problem in office hour]

[Case study: Monopoly vs. Generic Drugs]

The Welfare Cost of Monopoly

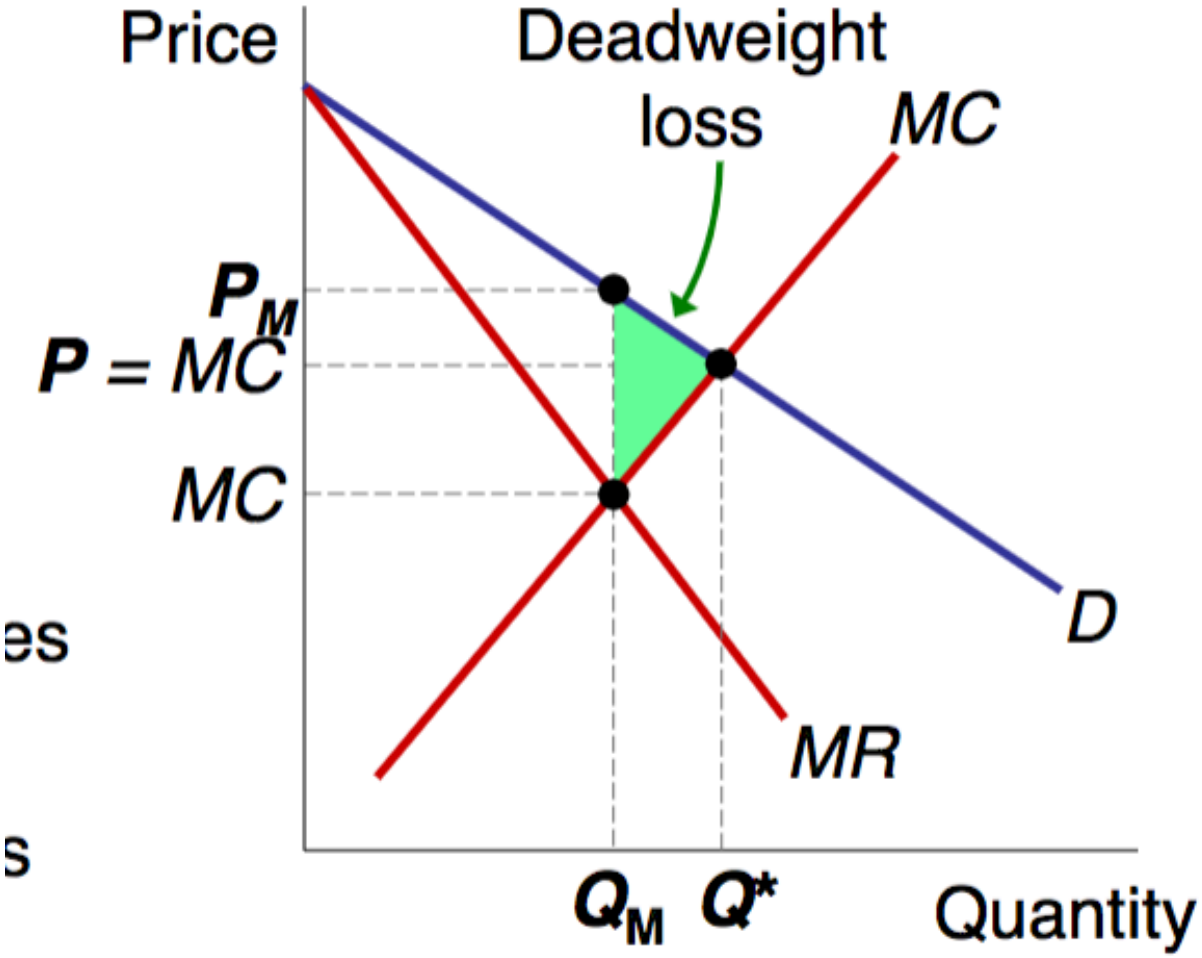
In a competitive market equilibrium, $P = MR = MC$ and total surplus is maximized.

In the monopoly equilibrium, P > MR = MC.

- WTP > MC for the marginal unit Q_M
- Q_M is too low: larger total surplus with more Q produced
- $Q_M < Q^*$ equilibrium Q under perfect competition

DWL occurs as a result of monopoly

Monopoly equilibrium, at Q_M, P > MC and DWL arises. Note some of consumer surplus goes to the monopoly as producer surplus.



`Price Discrimination`

The above analysis for a single-price monopoly: one price for all unit of a good it sells.

It is possible for the monopoly to earn even more? Yes! By price discrimination and know buyers' WTP for doing that.

`Price Discrimination` is the practice of selling different units of a good or service for different prices. To be able to price discriminate, a monopoly must:

- Identify and separate different buyer types.
- Sell a product that cannot be resold.

Price differences that arise from cost differences are no price discrimination.

In the case of perfect price discrimination - Demand curve is the MR curve.

Hence, the monopolist produces the competitive quantity, but charges each buyer his or her WTP. This is called perfect price discrimination. The monopolist captures all CS as profit. But there is no DWL.

In the real world, perfect price discrimination is impossible:

- No firm knows every buyers' WTP
- Resell of goods among buyers with different WTP

Even though perfect price discrimination is impossible in practice, a monopoly can "test/experiment" consumers and try to make estimates.

Two ways of price discriminating

- Discriminate among groups of buyers
- Discriminate among units of a good

Examples:

- Movie Tickets

  Discounts for seniors, students, and people who can attend during weekday afternoons. They are all more likely to have lower WTP than people who pay full price on Friday night.

- Airline Prices

  Discounts for Saturday-night stayovers help distinguish business travelers, who usually have higher WTP, from more price-sensitive leisure travelers.

- Discount coupons

  People who have time to clip and organize coupons are more likely to have lower income and lower WTP than others.

- Need-based financial aid

  Low income families have lower WTP for their children's college education.

  Schools price-discriminate by offering need-based aid to low income families.

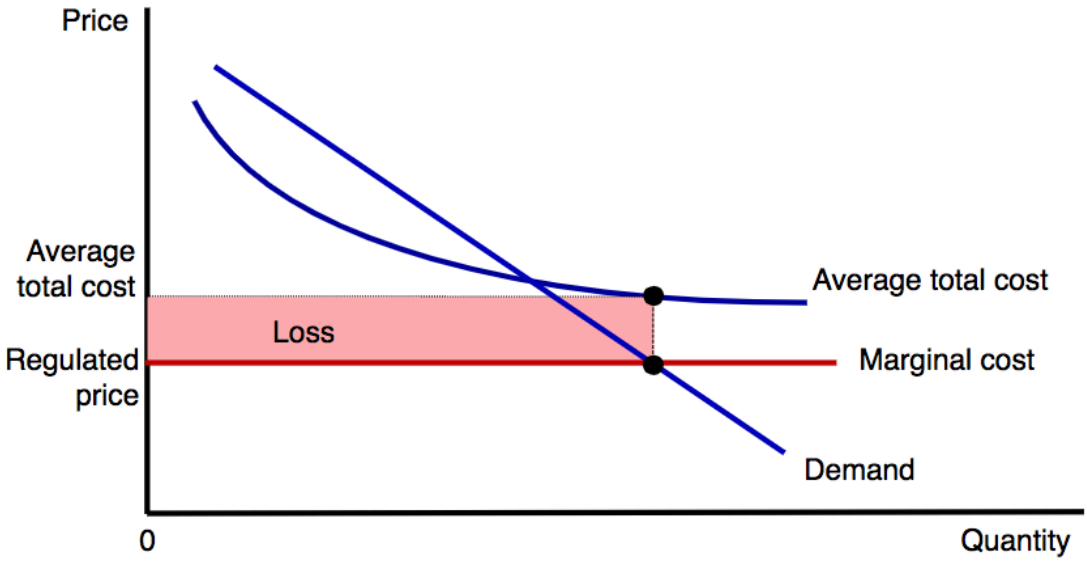
- Quantity discounts

  A buyer's WTP often declines with additional units, so firms charge less per unit for large quantities than small ones. A movie theater charges $\4 for a small popcorn and $5 for a large one that's twice as big.

Public Policy Toward Monopolies

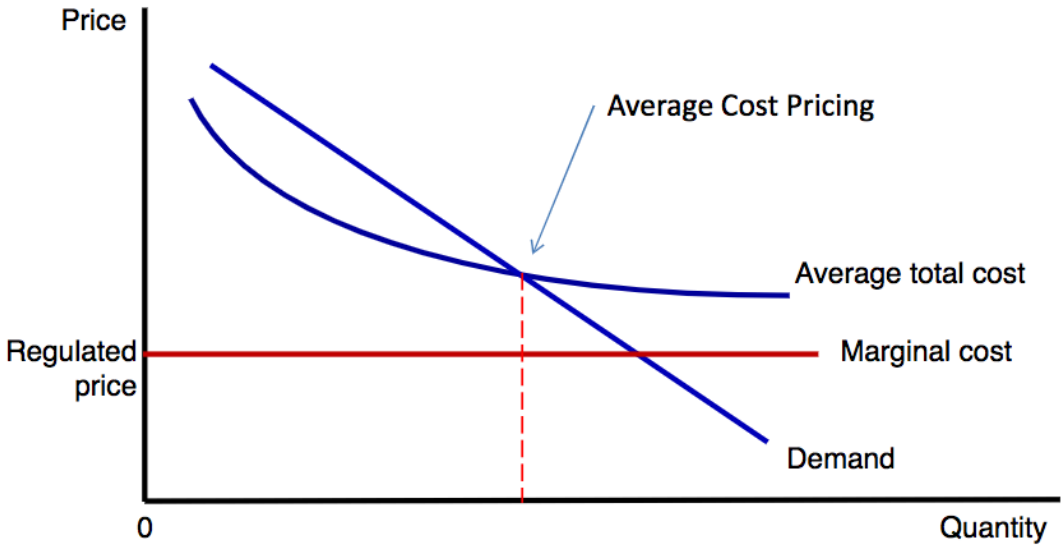
- Increasing competition with antitrust laws
  - Ban some anticompetitive practices, allow government to break up monopolies
- Regulation
  - Set Monopolist's price
  - For natural monopolies, MC < ATC at all Q, so marginal cost pricing would result in losses
  - If so, regulators might subsidize the monopolists or set $P = ATC$ for zero economic profit.

Regulating Natural Monopoly – MC Pricing



A natural monopoly to charge a price equals to MC, P will be below ATC, and the monopoly is in loss. Using MC pricing, government subsidies the loss, Or Average cost pricing.

Regulating Natural Monopoly – AC Pricing



Average Cost Pricing means zero economics profit for monopoly, but leads to DW loss. How big the DW loss in the above diagram?

- Public Ownership
  - US Postal Service
  - Public Ownership is usually less efficient since no profit motive to minimize costs.
- Doing nothing
  - The foregoing policies all have drawbacks, so the best policy maybe no policy.

conclusion

In the real world, pure monopoly is rare.

Yet many firms have market power, due to:

- Selling a unique variety of a product
- Having a large market share and few significant competitors

In many such cases, most of results from this chapter apply, including,

- Markup of price over marginal cost
- DWL

Summary

A monopoly firm is the sole seller in its market.

Monopolies arise due to barriers to entry, including: government-granted monopolies, the control of a key resource, or economies of scale over the entire range of output.

A monopoly firm faces a downward-sloping demand curve for its product. As a result, it must reduce price to sell a larger quantity, which causes marginal revenue to fall below price.

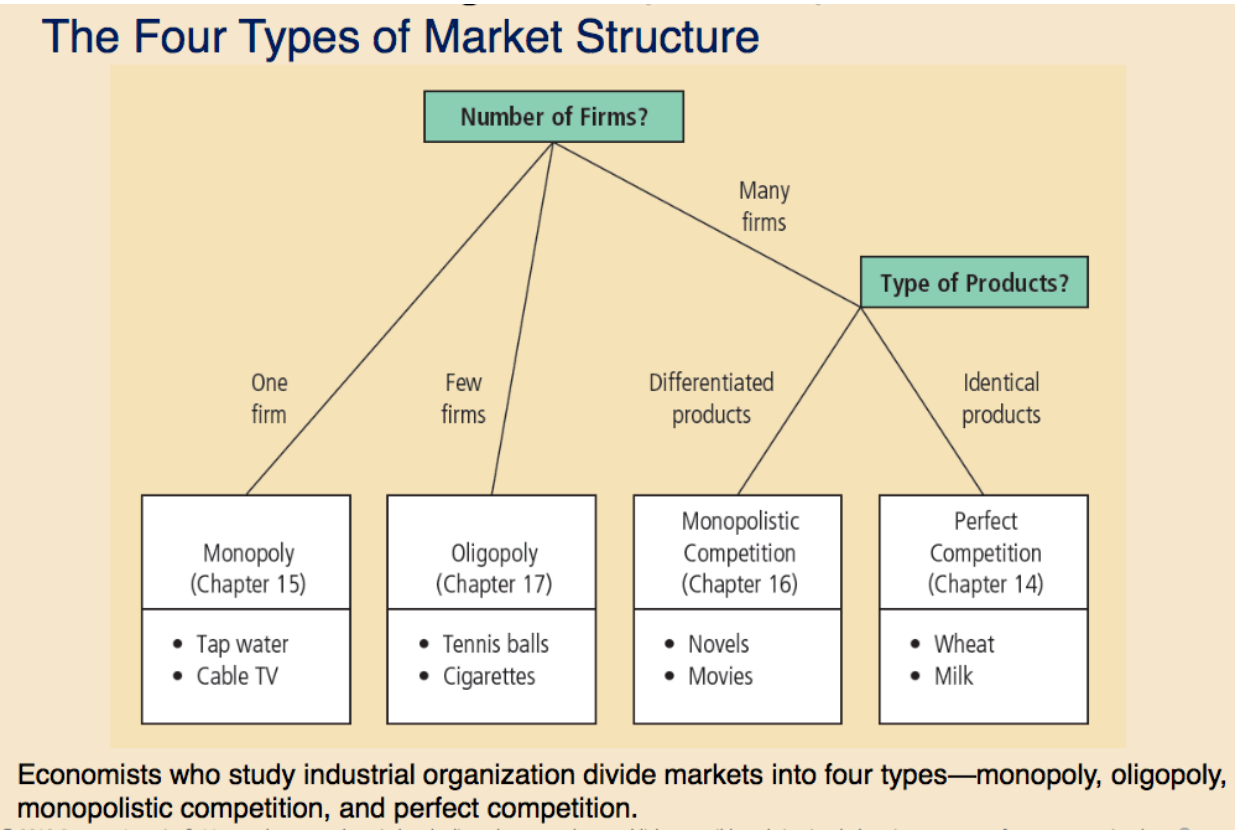
Monopoly firms maximize profits by producing the quantity where marginal revenue equals marginal cost. But since marginal revenue is less than price, the monopoly price will be greater than marginal cost, leading to a deadweight loss.

Monopoly firms (and others with market power) try to raise their profits by charging higher prices to consumers with higher willingness to pay. This practice is called price discrimination.

Policymakers may respond by regulating monopolies, using antitrust laws to promote

competition, or by taking over the monopoly and running it. Due to problems with each of these options, the best option may be to take no action.

Chapter 17 Oligopoly



Economists who study industrial organization divide markets into four types—monopoly, oligopoly, monopolistic competition, and perfect competition.

`Concentration Ratio` the percentage of the market's total output supplied by its four largest firms. The higher the concentration ratio, the less competition. This chapter focuses on oligopoly, a market structure with high concentration ratios.

`Oligopoly` is a market structure in which

- A small number of firms compete. (Natural or legal barriers prevent the entry of new firms.)
- Offer similar or identical products

What is oligopoly?

`Strategic behavior in oligopoly`

A firm's decisions about P or Q can affect other firms and cause them to react. The firm will consider these reactions when making decisions.

`Game Theory` the study of how people behave in strategic situations.

A tool for studying strategic behavior, which is behavior that takes into account the expected behavior of others and the mutual recognition of interdependence.

Four common features: Rules, strategies, payoffs, outcome

`Prisoners' Dilemma` A 'game' between two captured criminals that illustrates why cooperation is difficult even when it is mutually beneficial.

`Rules` The rules describe the setting of the game, the actions the players may take, and the consequences of those actions. Each is held in a separate cell and cannot communicate with the other.

`Strategies` are all the possible actions of each player.

`Payoffs` We can tabulate these outcomes in a payoff matrix. A payoff matrix is a table that shows the payoffs for ever possible action by each player for every possible action by the other player.

`Outcome` If a player makes a rational choice in pursuit of his own best interest, he chooses the action that is best for him, given any action taken by the other player. If both players are rational and choose their actions in this way, the outcome is an equilibrium called a `Nash equilibrium` — first proposed by John Nash.

`Dominant Strategy`: a strategy that is best for a player in a game regardless of the strategies chosen by the other players.

Example: Cell Phone Duopoly in Smalltown

`Collusion` an agreement among firms in a market about quantities to produce or prices to charge.

`Cartel` a group of firms acting in unison

Both firms would be better off if both stick to the cartel agreement. But each firm has incentive to renege on the agreement. Hence, it is difficult for oligopoly firms to form cartels and honor their agreements.

A comparison of market outcomes

When firms in an oligopoly individually choose production to maximize profit,

- oligopoly Q is greater than monopoly Q but smaller than competitive Q
- oligopoly P is greater than competitive P but less than monopoly P

The Output & Price Effects

- Output effect: If P > MC, increasing output raises profits.
- Price effect: Raising output increases market quantity, which reduces price and reduces profit on all units sold.
- If output effect > price effect, the firm increases production
- If price effect > output effect, the firm reduces production

The size of the Oligopoly

As the number of firms in the market increases,

- The price effect becomes smaller
- The oligopoly looks more and more like a competitive market

- P approaches MC
- The market quantity approaches the socially efficient quantity

Another benefit of international trade Trade increases the number of firms competing, increases Q and brings P closer to marginal cost.

Other Examples of the Prisoners' Dilemma

- Ad Wars
- Organization of Petroleum Exporting Countries
- Arms race between military superpowers
- Common resources

The non-cooperative oligopoly equilibrium

- Bad for oligopoly firms: prevents them from achieving monopoly profits
- Good for society:
  - Q is closer to the socially efficient output
  - P is closer to MC
- In other prisoners' dilemmas, the inability to cooperate may reduce social welfare (e.g. arms race, overuse of common resources)

[Negative Campaign Ads] Negative social welfare

[Battle of the Sexes] Coordination failure is not an equilibrium. Players want to change their choice

Why people sometimes cooperate

When the game is repeated many times, cooperation may be possible.

Two strategies that may lead to cooperation:

- If your rival reneges in one round, you renege in all subsequent rounds
- TFT, Whatever your rival does in one round, you do in the following round

TFT strategy encourages the reaching of cooperative equilibrium by playing cooperative at first and tooth for a tooth later

Public Policy Toward Oligopolies

In oligopolies, production is too low and prices are too high, relative to the social optimum.

Role for policymakers:

Promote competition, prevent cooperation to move the oligopoly outcome closer to the efficient outcome.

Controversies

Most people agree that price-fixing agreements among competitors should be illegal. Some economists are concerned that policymakers go too far when using antitrust laws to stifle business practices that are not necessarily harmful, and may have legitimate objectives.

[We consider three such practices] What are three such practices considered.

Conclusions

- Oligopolies can end up looking like monopolies or like competitive markets, depending on the number of firms and how cooperative they are.
- The prisoners' dilemma shows how difficult it is for firms to maintain cooperation, even when doing so is in their best interest.
- Policy makers use the antitrust laws to regulate oligopolists' behaviors. The proper scope of these laws is the subject of ongoing controversy.

Summary

Oligopolists can maximize profits if they form a cartel and act like a monopolist.

Yet, self-interest leads each oligopolist to a higher quantity and lower price than under the monopoly outcome.

The larger the number of firms, the closer will be the quantity and price to the levels that would prevail under competition.

The prisoners’ dilemma shows that self-interest can prevent people from cooperating, even when cooperation is in their mutual interest. The logic of the prisoners’ dilemma applies in many situations.

Policymakers use the antitrust laws to prevent oligopolies from engaging in anticompetitive behavior such as price-fixing. But the application of these laws is sometimes controversial.

To-dos for Final

Book Chapters

Chapter 1-Chapter3

- [ ] 1-1

- [ ] 1-2
- [ ] 2

Chapter 4 - Chapter 5

- [ ] Chapter 4
- [ ] Chapter 5

Chapter 7

- [ ] 7-1
- [ ] 7-2
- [ ] 7-3

Government meets markets

- [ ] 6-1
- [ ] 6-2
- [ ] 8-1
- [ ] 8-2
- [ ] 8-3

Cost of Production

- [ ] 13-1
- [ ] 13-2
- [ ] 13-3
- [ ] 13-4

Organization of Industry

- [ ] Chapter 14
- [ ] Chapter 15
- [ ] Chapter 17