

Chapter 1 – Introduction**What is Economics?**

Concerned with how people respond to incentives.

Scarcity: Limited wants

Resources: Factors of Production

- Land / Raw Materials
- Labor
- Physical Capital
- Entrepreneurship

Microeconomics: Focuses on the individual parts of the economy.

Macroeconomics: Looks at the economy as a whole.

Economic Rationality

Rational People: Use information they have to consider costs and benefits of some action. Consumers do this often. If benefits outweigh the costs.

Perfect Information: Everyone knows everything they need to with certainty. Everything that would impact the decision is known. Unlikely, rare.

Asymmetric Information: Imperfect information; one person has more information than the other person. When one party has more information than the other party.

Marginal Thinking

Rational people make Marginal Changes: small incremental changes to existing plan.

Opportunity Cost

The cost of something is what you give up to get it.

It is the cost of the best forgone alternative.

Explicit Costs: You get a receipt.

Implicit/Opportunity Costs: Not paid with money.

Total Opportunity Cost = Explicit + Implicit

Market

Where buyers and sellers meet to buy/sell goods and services.

- Physical Place
- Online

Free Markets: All decision making is decentralized. The people make the decision.

Centrally Planned Economy: All production and distribution decisions are made by a central authority, like a government.

Mixed Economy: A combination of mainly free markets and some government-run industries. Eg: Canada.

Efficiency and Equity

Reasons for government intervention:

- 1) Promote Efficiency
- 2) Promote Equity

Efficiency: Society makes the best use of its resources (size of the pie)

(Markets left to operate freely usually lead to efficiency)

Equity: Involves the fair distribution of resources (how the pie is divided)

More efficiency = Less equity

Less efficiency = More equity

Economic Models

Economics is a Social Science

- Social: People
- Science: Use scientific method
 - Observe
 - Theorize
 - Test Theory

Positive statements: Attempt to describe the world as it is. Description analysis. Can be backed up by data. Can be false.

Normative statements: Attempt to describe how the world should be. How to improve. Opinion-based.

Simple Model [Players]

Firms:

- Produce and sell goods and services
- Hire and use factors of production

Households:

- Buy and consume goods and services
- Own and sell factors of production

Government:

- Buy and consume goods and services
- Tax firms and households
- Distribute transfer payments to households

Simple Model [Flows]

- Income
- Goods and services

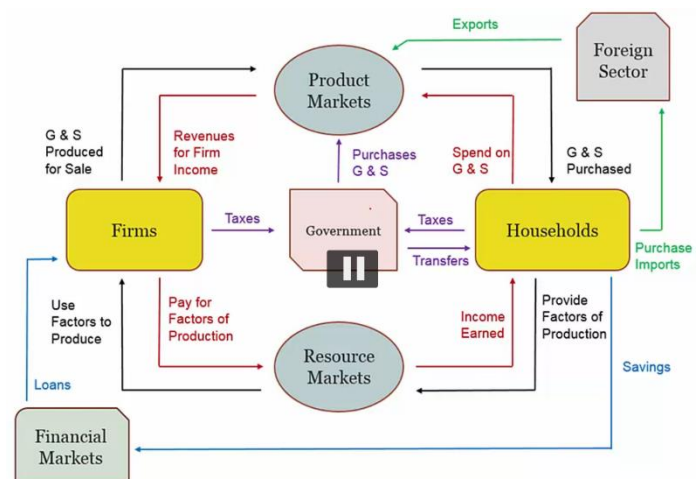
Simple Model [Markets]

Product Markets: Goods and services are exchanged

Resource Markets: Where land, labor, and physical capital is exchanged

Financial Markets: Where our savings and loans come from.

Foreign Market: Export/Import goods and services.



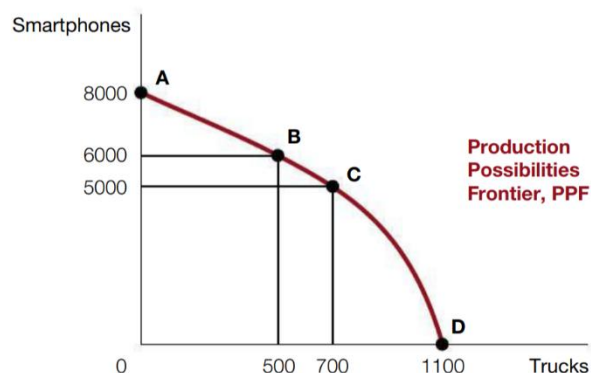
Black loop: Flow of goods and services

Red loop: Flow of income

Chapter 2 – Production Possibilities and Gains from Trade

Production possibilities frontier (PPF)

Production possibilities frontier (PPF): Graph showing combinations of output economy can produce given available **factors of production** and available production **technology**.

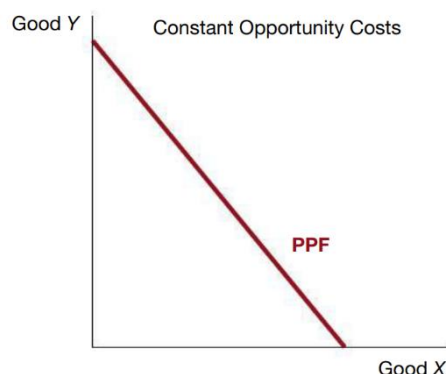


- PPF illustrates opportunity costs
- PPF Curve is bowed out from the origin.
- Points on the curve are productively efficient.
- Efficient:
 - Productive efficiency
 - Social efficiency (what the people want)
- Points outside of this curve are unattainable. Not feasible.
- Points within the curve is attainable/feasible but not efficient. You could be making more.
- Going down the PPF → increasing opportunity costs.

Resource Endowment: The amount of resources an economy has at a given moment.

Opportunity costs increase as you specialize

It is also possible that opportunity costs are constant. Giving up the same amount of one good for more of another at the same rate. Linear PPF line. Resources are **not** specialized. **Perfectly Shiftable**.



$$|Slop\ of\ PPF| = OC\ of\ X - Axis$$

Shifts in the PPF

Any changes to resource availability or technology will shift the PPF.

- Economic growth shifts the PPF to the right.
- Economic contraction shifts the PPF to the left.
- If you get an innovation in the Y-Axis, you will get a pivot upwards. Does not impact the endpoint of the X-Axis.
- If you get an improvement in something that effects both Axis, you will get a bigger PPF. Parallel Shift Outwards.
- If you get an issue that impacts the X-Axis, you get a pivot inward at the X-Axis endpoint.

If the RE increases or tech improves, the PPF could shift over time.

Gains from Trade

Self-Sufficient: Consumes only what they can produce.

PPF is also a Consumption Possibilities Frontier.

Comparative Advantage: The ability to produce a good with a lower opportunity cost than someone else. Whoever has a comparative advantage should specialize in the production of that good, and trade.

Absolute Advantage: The ability to produce a good with a smaller quantity of inputs.

$$\text{Productivity} = \frac{\text{Quantity Produced}}{\text{Number of Inputs Used}}$$

Gains from specialization and trade are based on comparative advantage only.

Cannot have CA in both goods. If you specialize, you make more, total production in economy rises, bigger pie.

Gains from Trade

General Rule: For both parties to gain from trade, the price at which they trade must lie between the two opportunity costs.

Compare Without Trade and With Trade to get Gains from Trade (increase in consumption)

Can be outside of the PPF curve with trade.

Chapter 3 – Demand, Supply, and Market Equilibrium

Markets

Buyers – determine demand

Sellers – determine supply

Supply and Demand: Behavior of people as they interact with one another in markets

- Perfect Competition:
- Many buyers and sellers
- All have negligible impact on market prices... PRICE TAKERS
- Firms all sell homogeneous products
- Free entry and exit of the market

Demand

Quantity demanded, Qd: amount of good/service that consumers are willing & able to buy at given price, P

P and Qd are negatively related: As one goes UP, the other goes DOWN.

Law of Demand: Other things equal (ceteris paribus), when the price of a good rises, the quantity of that good falls.

Demand Schedule: Table showing relationship between price and quantity demanded for a good.

Demand Curve: Graph of demand schedule

Market Demand: Sum of all individual demands

Change in Quantity Demanded: Movement along the demand curve caused by a change in price. The demand curve itself does not move. Price change in present moment.

Change in Demand: Curve shifts due to a change in a determinant of demand other than price.

- Increase in demand → Shift right/Up
- Decrease in demand → Shift left/Down

Determinants:

- Income:
 - Income increases, you buy more of a good = **normal good**
 - Income increases, you buy less of a good = **inferior good**
- Prices of Related Goods in Consumption:
 - Increase in price of one good → increase in demand for another good = **substitutes** (ex. Coke/Pepsi)
 - Increase in price of one good → decrease in demand for another good = **complements** (ex. Cars/Gas)
- Tastes:
 - If peoples' preferences change towards a good, demand will change.
 - Advertising, Gov Policies, Seasonal Factors
- Expectations:
 - What you expect in the future may affect your demand for a good today.
 - Waiting for price to drop
- Number of Buyers:
 - An increase in population (increase in consumers) will increase demand.

Supply (Firms)

Quantity Supplied, Qs: Amount of a good that sellers are willing and able to sell.

Price and Qs are positively related.

Law of Supply: The quantity supplied of a good rises when the price of the good rises.

Supply Schedule: Table showing the relationship between the price of the good and the quantity supplied.

Supply Curve: Graph of the supply schedule

Market Supply: The sum of individual supply curves.

Change in Quantity Supplied: Movement along the supply curve due to change in selling price of good. Curve does not move.

Change in supply: Curve shifts due to a change in any of its determinants except price.

- Increase in supply → Shift Right/Down
- Decrease in supply → Shift Left/Up

Determinants:

- Input Prices
 - When price of a factor of production increases, firms produce less. Vice/Versa
- Prices of Related Goods in Production
 - Substitutes in Production: A choice between alternative products firm can produce using same resources (single houses or townhouses)
 - Complements in Production: Two or more goods produced simultaneously using the same resources (cattle: beef and leather)
- Technology
 - Advances in tech which reduce production costs will increase supply.
- Expectations
 - If a firm expects selling price to increase in the future, it will hold off selling now and current supply will decrease.

- Number of Firms
 - More firms in the market means more supply. Market Supply.

Market Equilibrium

Equilibrium: Price reaches level where $Q_s = Q_d$

No one is left without the good and no one has any extra at a prevailing market price → **market clears**

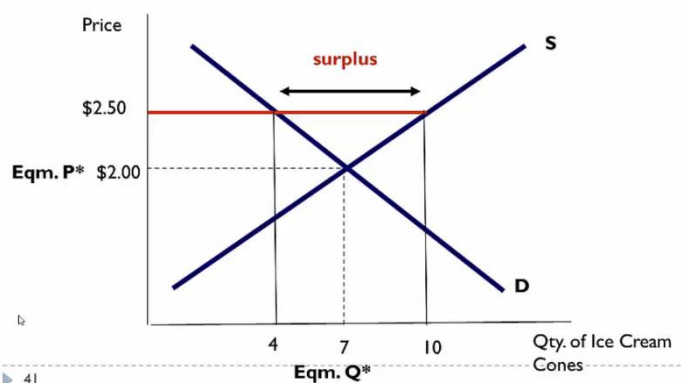
Equilibrium Price: Price when $Q_s = Q_d$

Equilibrium Quantity: Quantity when $Q_s = Q_d$

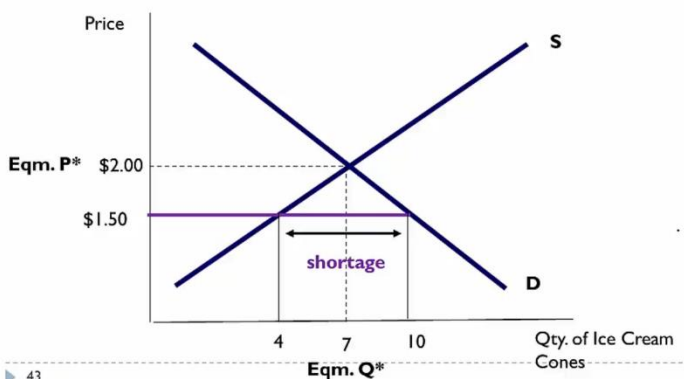
Equilibrium Traded: Quantity actually sold

Not Equilibrium: If $Q_s > Q_d$ = **surplus** or **excess supply**

Firms want to reach equilibrium. No pressure on price to change. At surplus; pressure on price to fall.



Not Equilibrium: If $Q_d > Q_s$ = **shortage** or **excess demand**. Upward pressure on price.



Law of Supply and Demand: Price of any good adjusts to bring $Q_s = Q_d$

Market returns to equilibrium if left to **operate freely** – market clears.

Changes in Equilibrium

Comparative statics: Using our diagrams to see what happens to equilibrium when curves shift.

- 1) Event shifts the supply or demand curve (perhaps both)?
- 2) Curve shifts to the left or right?
- 3) Use supply-and-demand diagram to see how shift changes equilibrium price and quantity

When D and S both shift, what happens to eqm. P and Q depends on the size of the relative shifts.

If Both increase, change in P is ambiguous:

- No change in P, increase in Q
- Price decrease, Q increase
- Price increase, Q increase

	No Change in Demand	An Increase in Demand	A Decrease in Demand
No Change in Supply	P Q	P rises Q rises	P falls Q falls
An Increase in Supply	P falls Q rises	P ambiguous Q rises	P falls Q ambiguous
A Decrease in Supply	P rises Q falls	P rises Q ambiguous	P ambiguous Q falls

Economic Shock: Something that happens outside of a market but has an economic impact in the market. Like a natural disaster lowering wheat supplies, increasing bread price.

$$Q = f(P)$$

$$\text{Graphed: } P = f(Q)$$

Chapter 4 – Elasticity of Demand**Elasticity**

Measure of how much buyers and sellers respond to changes in market conditions

Measures how responsive Qs or Qd is to changes in (determinants):

- Price
- Income
- Prices of related goods in consumption

$$E = \frac{\% \Delta \text{ in } Q}{\% \Delta \text{ in determinant}}$$

Own-Price Elasticity of Demand (Ep)

Ep: Measures how much the quantity demanded of a good responds to a change in the price of that good.

Coefficient of Elasticity: The number we get from our calculation

Size of coefficient will tell us how elastic the good is. How responsive demand is to a price change.

Inelastic Demand

Quantity demanded does not respond strongly to price changes.

- The % change in Qd < % change in P.
- $E_p < 1$
- Demand curve = fairly steep
- Stuff that we have to buy. Necessities.

Elastic Demand

Quantity demanded responds strongly to changes in price. Most manufacturers.

- The % change in Qd > % change in P.
- $E_p > 1$ Demand Curve = Fairly Flat

Perfectly Inelastic Demand

Quantity demanded does not respond to price changes at all. Extreme.

- $E_p = 0$
- Demand curve = Vertical
- Slope = Undefined

Perfectly Elastic Demand

Quantity demanded changes infinitely with any change in price.

- $E_p \Rightarrow \text{Infinity}$
- Demand Curve = Horizontal = Slope 0
- Characteristic of perfect competition
- Any P above P^* demand is 0
- Any P below P^* demand is infinite

Unit Elastic Demand

Quantity demanded changes by the same percentage as the price

- $E_p = 1$
- Demand Curve = Non-Linear
- No goods exist that are like this

Point Elasticity

Measures the impact of a marginal change in price on quantity demanded.

$$E_p = \left(\frac{dQ}{dP} \right) \times \left(\frac{P}{Q} \right)$$

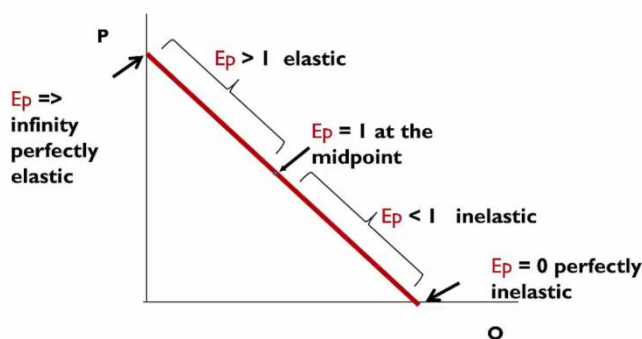
dQ/dP is the slope of the demand curve in $Q_d = a - bP$ where b is the slope.

When we calculate Own Price Elasticity, we take the absolute value.

Determinants of E_p

- Close Substitutes: Goods with close subs have more elastic demand
- Necessity vs Luxury: Luxury goods have more elastic demand
- Definition of Market: The more narrowly define the market, the more elastic demand of good is.
- Time Period: Goods tend to have more elastic demand over longer time horizon. Demand inelastic in the short run.

Elasticity is not constant along a demand curve:

Total Revenue

TR: Amount a firm receives for the sale of its output.

$$TR = P \times Q$$

Inelastic demand curve: Increase in price leads to proportionately smaller decrease in quantity demanded. Price goes up leads to **increase** in TR. Must increase price.

Elastic demand curve: Increase in the price leads to a proportionately larger decrease in quantity demanded. Price goes up leads to **decrease** in TR. Must decrease price.

Unit Elastic demand curve: Gain to TR from a P increase (or decrease) will be exactly offset by the decrease (or increase) in Q. No change in P will increase TR, so TR must be at a maximum when $E_p = 1$.

Income Elasticity of Demand (E_i)

Measures how much the quantity demanded of a good responds to a change in consumer's income.

$$E_i = \frac{\% \Delta \text{ in } Q_d}{\% \Delta \text{ in } I}$$

- If $E_i > 0$: The good is a normal good. As I increases, Q_d increases. +
- If $E_i < 0$: The good is an inferior good. As I decreases, Q_d increases. –
- If E_i is between -1 and 1, the good is income **inelastic**. Q_d doesn't change with changes in income. **Necessities**.
- If E_i is greater than 1 or less than -1, the good is income **elastic**. Q_d changes with income changes. **Luxuries**.

Cross-Price Elasticity of Demand (E_{ab})

E_{ab} : Measures the responds of Q_d of good "a" to a change in price of good "b".

$$E_{ab} = \frac{\% \Delta \text{ in } Q_d \text{ of } A}{\% \Delta \text{ in } P \text{ of } B}$$

- If $E_{ab} > 0$, Increase in P of B will Increase Q_d of A. **Substitutes**.
- If $E_{ab} < 0$, Increase in P of B will Decrease Q_d of A. **Complements**.
- If $E_{ab} = 0$, the two goods are **not related**.

Price Elasticity of Supply (Es)

Es: Measures how much the quantity supplied of a good responds to a change in the price of that good. Since P and Qs always move in the same direction, Es will always be positive > 0.

Perfectly Inelastic Supply

- Es = 0
- Supply curve is vertical
- No close substitutes in production
- Agricultural products/ rare art
- If you have like 500 stadium seats.

Inelastic Supply

- Es between 0 and 1 (fraction)
- Supply curve is fairly steep
- Need lots of capital and resources.

Elastic Supply

- Es > 1
- Supply curve is fairly flat
- Most manufacturers. Little capital/abundant resources/no skilled labor needed. Hot Dog vendor.

Perfectly Elastic Supply

- Es => infinity
- Supply curve is horizontal
- Any good for which a decrease in selling price means a firm will not supply any amount. This would be the case if the price fell to a point where all suppliers would lose money. Theoretical extreme.
- At any P above P*, infinite supply
- At any P below P*, supply is 0

Unit Elastic Supply

- Es = 1
- When percent change in P is = Q
- No good real world examples
- Line goes through origin.

$$Es = \frac{\% \Delta \text{ in } Qs}{\% \Delta \text{ in } P}$$

$$Es = \left(\frac{dQs}{dP} \right) \times \left(\frac{P}{Qs} \right)$$

Determinants

- Key determinant is Time.
- Supply is usually more elastic in the long run than in the short run.

Chapter 5 – Welfare, Externalities, and Public Goods Pg 69-77

Welfare Economics: The study of how the allocation of resources affects economic well-being. Equilibrium results in the maximum total welfare for both buyers and sellers.

Willingness-To-Pay: The maximum amount that a buyer will pay for a good. Aka reservation price. WTP.

- When a buyer actually pays less than he is willing to pay, he enjoys a benefit (**consumer surplus**).

Consumer Surplus

The buyer's willingness to pay for a good minus the amount the buyer actually pays for it.

The market demand curve depicts consumers' WTP.

Total Consumer Surplus = Sum of all Net Benefits. Depends on selling price and people willing to buy at that price.

CS = Below the D-Curve and above the selling price up to the point you are producing. Area of that area. Consumer surplus is a monetary value.

People below the selling point are not in the market. D-Curve is WTP.

- Price Increase = Decrease in CS
- Price Decrease = Increase in CS
- Rectangle is increase in CS for OG buyers
- Triangle is new consumers

$$CS = WTP - P$$

Producer Surplus

The amount a seller is paid for a good minus the seller's cost.

Measures the benefit to sellers participating in a market.

Cost is a measure of the seller's WTS: The lowest price a supplier will take to produce a good and offer it for sale.

- When a producer receives for than they are willing to take to produce a good, they enjoy a benefit. Producer Surplus.

At any quantity, the price given by Supply Curve, gives the cost of the marginal seller.

PS = area under the Equilibrium price point.

$$PS = P - Cost$$

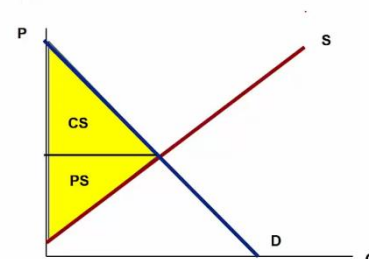
- Price Increase = Increase in PS
- Price Decrease = Decrease in PS
- Rectangle is increase in PS for OG sellers
- Triangle is new sellers.
- "By how much" would be just the R+T

Market Efficiency

Consumer surplus and producer surplus may be used to address the question: Is the allocation of resources determined by free markets in any way desirable?

- If allocation of resources maximizes total surplus, that allocation is **efficient**.
- If allocation of resources leads to well-being that's fairly distributed among society's members, that allocation is **equitable**. Total Surplus = CS + PS

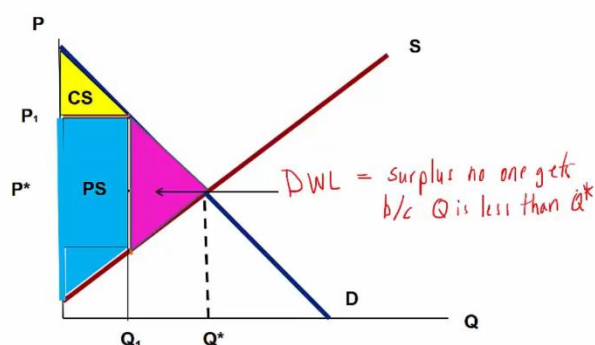
Free Markets:



- Allocate supply of goods to the buyers who value them most highly (highest WTP).
- Allocate demand for goods to the producers who can produce them at least cost.
- Produce the quantity of goods that maximizes the sum of consumer and producer surplus.

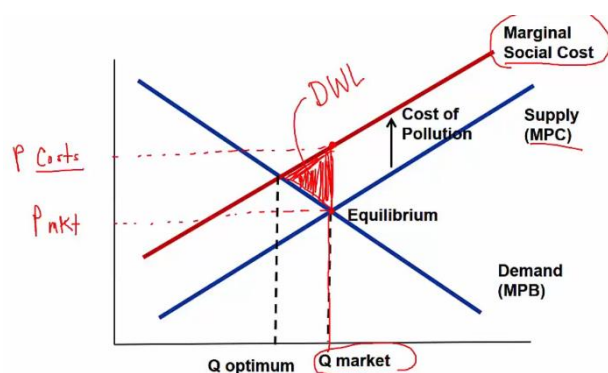
Deadweight Losses (DWL)

A loss in total surplus happens when the quantity traded is less than what would be traded when the market is in equilibrium.



No need for government intervention if we have equilibrium. Assumptions:

- Perfectly Competitive
- No externalities
- When these assumptions do not hold, equilibrium may not be efficient. Intervention may be needed.



Externalities

The uncompensated impact of one person's actions on the well-being of a bystander.

Positive externality: Benefit that is enjoyed by society but society doesn't pay to receive it.

Negative Externalities (Production)

Cost suffered by society, and the instigator isn't made to pay for the damage he does.

- Market outcome affects individuals other than buyers and sellers in that market
- Welfare in a market depends on more than just the benefits to the buyers and cost to the sellers
- Can lead to inefficient markets

Marginal Private Benefit, MPB: The maximum price someone would pay to consumer one more unit of the good. D-Curve.

Marginal Private Cost, MPC: The addition to the firm's total cost of producing one more good. S-Curve.

If we have negative externality; market equilibrium won't be efficient.

If a firm (industrial) emits pollution, the cost to society of the production is larger than the private costs of the producers.

Marginal Social Cost, MSC: MPC of producers plus the cost to public adversely affected by pollution. If you graph the MSC instead of the MPC, you get the Optimum Q and P.

MSC increases production costs. MSC to the left of MPC. Markets produce more than is socially desirable. Image to the left.

Policies for Negative Externalities

Government can internalize an externality:

1) Pigovian Tax

Impose a tax on producer to get them to produce less – to produce the socially desirable quantity.

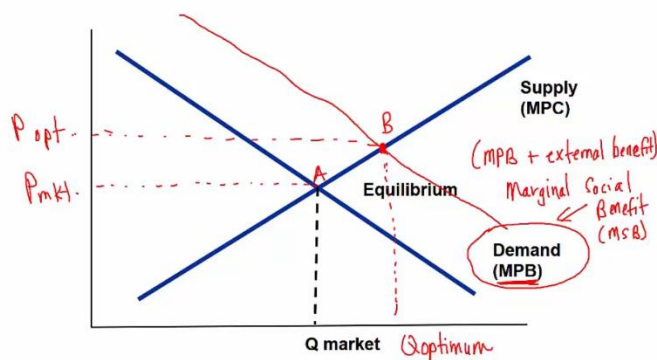
2) Tradable Pollution Permits

Regulate the amount of pollution a firm produces.

Positive Externalities (Consumption)

Drug helps those with a disease but also benefits all of society by limiting their exposure to disease.

Marginal Social Benefit, MSB: Marginal private benefit to those who get vaccinated + benefit to the rest of society.



Positive: Markets produce less than is socially desirable.

DWL is if you take A all the way up. That triangle.

Policy For Positive Externalities

The government can internalize the externality:

- Subsidize Production
- Ex; Education

No Government Intervention

Private sector can sometimes solve problems of externalities.

- Moral Codes
- Social Sanctions / Boycotts
- Charities
- Contracts between parties

The Coase Theorem

Private parties can solve the externalities problem on their own.

If they can bargain without cost over the allocation of resources. But property rights must be well defined.

Property Rights

The exclusive authority to determine how a resource is used, owned by government or by individuals.

Transaction costs of bargaining may be too high – lawyer fees, translator fees, too many people – coordination costs.

Whoever has the rights determines who pays who to reach an agreement.

- Cost < Right Benefit = No Deal
- Right Cost < Benefit = Pay to Right
- Cost > Benefit = Can offer Benefit money

Public Goods

Goods and Services supplied by the public sector. Consumers do not have to pay for these, provided by governments.

Price is absent. It's free! Without prices, markets can't guarantee that the good is produced and consumed in the right amount.

Excludability: People can be prevented from using the good or service.

Rivalry: One person's use of the good diminishes the ability of another person to use it. Eg, Parking Spaces.

1. Private Goods

- These are both excludable and rival.

2. Public Goods

- Neither excludable nor rival.
- Firework Show

3. Common Resources

- Rival but not excludable
- Fish in ocean

4. Club Goods

- Excludable but not rival.
- Cable TV

The Free-Rider Problem

People cannot be excluded from enjoying the benefits of a public good.

Free-Rider: Person who receives the benefit of a good but avoids paying for it.

Firms do not provide public goods because of this problem.

Government Involvement: If a show is socially desirable, it can tax each resident an amount not exceeding the value they place on the show.

Important Public Goods:

- National Defence
- Research

The total benefits of all those who use the good must be compared to the costs of providing and maintaining the public good.

- This is cost-benefit analysis
- Difficult for public goods.
- Prices are needed to estimate social benefits and resource costs.
- Rough estimates at best.

Common Resources

Air, Water, Roads, Highways, Wildlife

Can be overused, misused, and diminish others' ability to enjoy them.

Tragedy of the Commons: Misuse and/or overuse of a common or public good by looking out only for their own interest. Eg; Externality of a Cow.

Government Involvement

Governments try to avoid the tragedy of the common. Toll Roads. Prevent overuse and congestion by charging drivers.

If one use impacts others' use; it's rival.

- Laws
- Regulations
- Pigovian Taxes
- National Defence, Police, Fire Departments are not profitable for private firms so government provides them.

Chapter 6 – Government Policies

Equilibrium may be efficient, but not everyone is going to be satisfied.

Price Controls

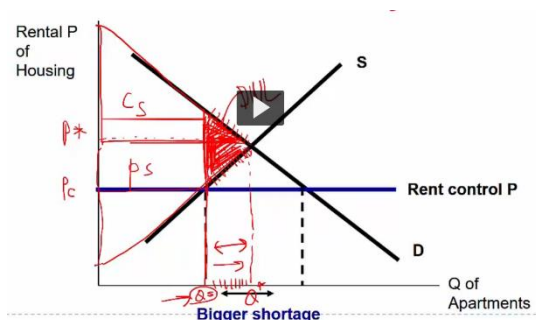
Enacted when policymakers believe the market price is unfair to buyers or sellers

Government will freeze prices at a predetermined level they feel will make society better off.

Price Ceilings

Legal maximum on the price at which a good can be sold.

- Not binding (not effective) if it is set above equilibrium price. **Surplus**.
- Binding (effective) if set below equilibrium price. **Shortage**.



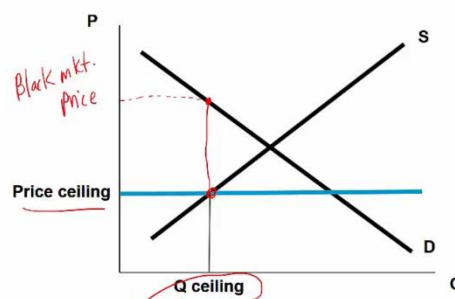
When rent-control exists, landlords must:

- Long waiting lists
- Can discriminate
- Can take bribes

Price Ceilings Can Lead To:

- Shortages that worsen over time
- Inefficient allocation to consumers
- Wasted resources
- Inefficiently low quality
- Black Markets

Black Market Price:



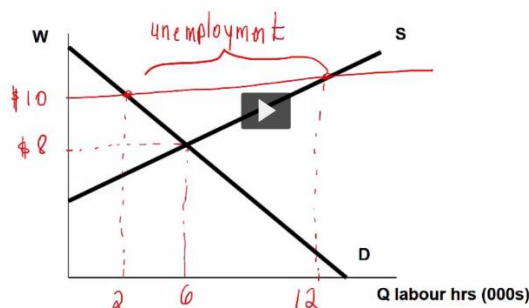
Price Floors

Legal minimum on the price at which a good can be sold.

- Price floor is not binding if set below the equilibrium price. **Shortage**.
- Price floor is binding if set above the equilibrium price. **Surplus**.
- If not binding, the market converges back to equilibrium.

Price Floors Can Lead To:

- Surplus Production
- Inefficient allocation of sales
- Wasted resources
- Inefficiently high quality
- Illegal activities

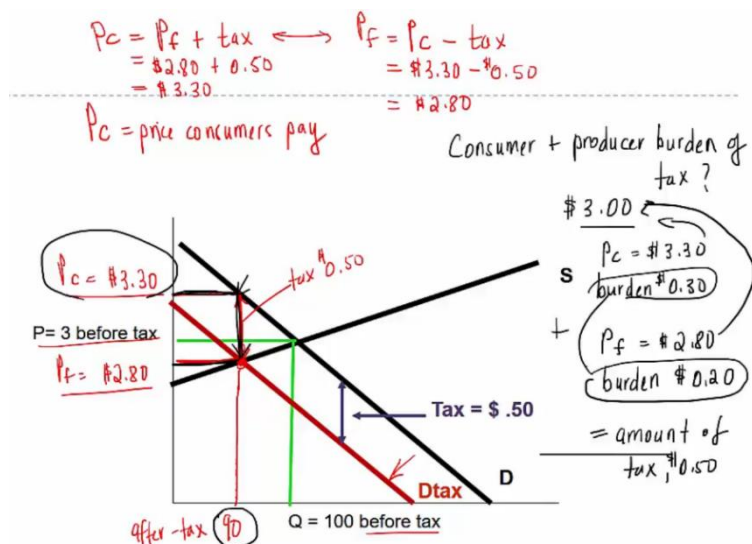


Taxes

Governments levy taxes to raise revenue for public projects.

Tax incidence is the distribution of a tax burden.

Demand curve **shifts down/left** by the amount of the tax.



$$\text{Tax Revenue} = (\text{Tax})(Q_{\text{after tax}})$$

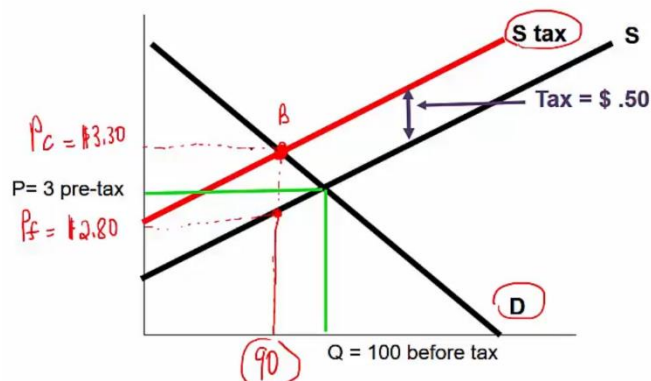
The square from P_f to P_c

A Tax on Suppliers

Government levies the tax on variety store owners.

Sellers react by supplying less

The supply curve will **shift up/left** by the amount of the tax.



Burden with consumer tax and supplier tax is the same. Revenue is, as well.

Taxes on consumers and suppliers are equivalent.

Taxes:

- Reduce the quantity traded = DWL
- Increase the price consumers pay
- Lower the price suppliers receive
- Reduce consumer/producer surplus

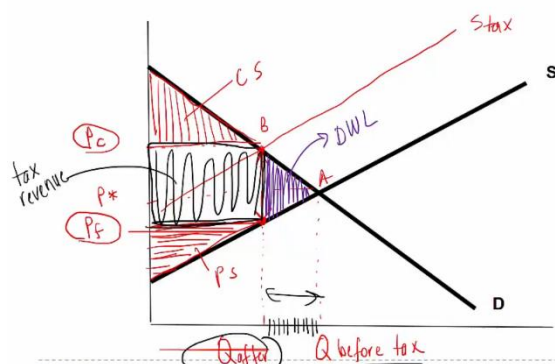
Elasticity and Tax Incidence

The side of the market which is more inelastic (steeper curve) bears a larger burden of the tax. Does not have to do with who the tax is levied upon.

- Consumer Burden: P^* and P_c
- Supplier Burden: P^* and P_f

Deadweight Loss of Taxation

Tax revenues are benefit.



Determinants of the DWL due to Tax

Size of DWL depends on how much Q_s and Q_d respond to changes in price.

- Price elasticities of supply and demand
- The size of the tax
- Tax Constant: Inelastic S -> Elastic S:
Greater DWL
- Tax Constant : Inelastic D -> Elastic D:
Greater DWL
- More tax = Greater DWL

The **greater** the elasticities of demand and supply:

- The **larger** the decline in equilibrium quantity.
- The **greater** the DWL of a tax.

$$P_c = P_f + T$$

$$P_f = P_c - T$$

$$\text{Tax Revenue} = T * Q$$

Chapter 7 – Production and Costs

Economic goal of every firm is to maximize its profits.

Total Revenue (TR): Amount a firm receives for the sale of its output. $P \cdot Q$.

Total Cost (TC): The market value of inputs a firm uses in production. Explicit/Implicit Costs.

$$\text{Profit } \pi = \text{Total Revenue} - \text{Total Cost}$$

Economic Profit = TR – TC (implicit/explicit)

Accounting Profit = TR – TC (explicit only)

- $EP < AP$ always
- Positive EP: $TR > TC$
- Economic Losses: $TR < TC$
- Normal economic profit: $TR = TC$

The Production Function

Shows relationship between quantity of inputs used to make a good and the quantity of output of that good.

Two Types of inputs:

- 1) Fixed inputs – cannot vary in quantity for some time (ex: Physical Capital)
- 2) Variable Inputs – Vary in quantity (ex: Labour)

Short Run (SR): The period of time in which at least one input into production is fixed.

Long Run (LR): The period of time in which all inputs into production can vary.

Time period is industry and technology dependent.

- Output increases at a decreasing rate.

Marginal Product

Increase in output that arises from an additional unit of an input. Slope of Q.

$$MP = \frac{\Delta Q}{\Delta \text{Input}}$$

Feature of Production diminishing Marginal Productivity

Diminishing Marginal Product

Marginal product of an input declines as the quantity of the input increases.

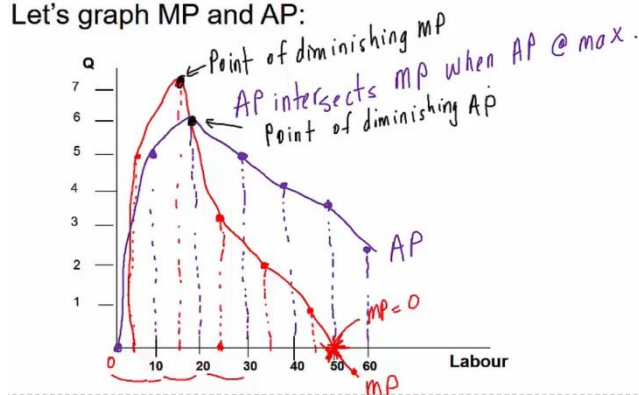
TP is maximized when MP slope = 0.

Average Product (AP)

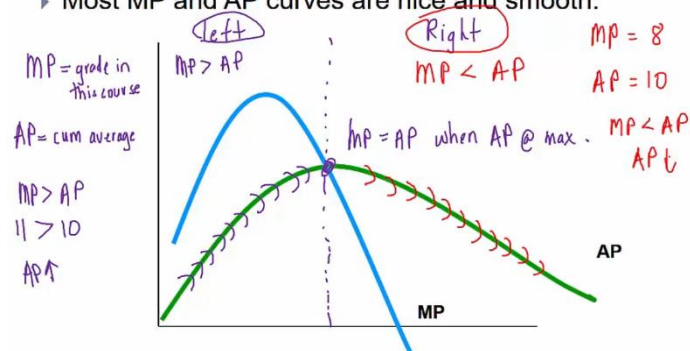
Tells us the quantity of output per input. AP will also diminish at some point.

$$AP = \frac{Q}{\# \text{ of Inputs}}$$

Let's graph MP and AP:



► Most MP and AP curves are nice and smooth:



Costs in The Short Run

Total Fixed Costs: Costs that do not vary with the quantity of output produced. Rent

Total Variable Costs: Costs that do vary with the quantity of output produced.

$$\text{Total Cost} = \text{Total Fixed Cost} + \text{Total Variable Cost}$$

If there are fixed costs, the time period must be the short run.

Average Costs

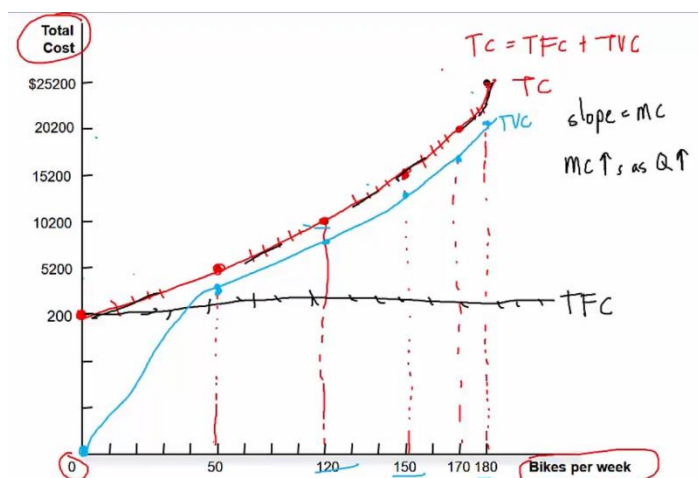
- $ATC = TC/Q = AFC + AVC$
- $AFC = TFC/Q$
- $AVC = TVC/Q$

Marginal Cost

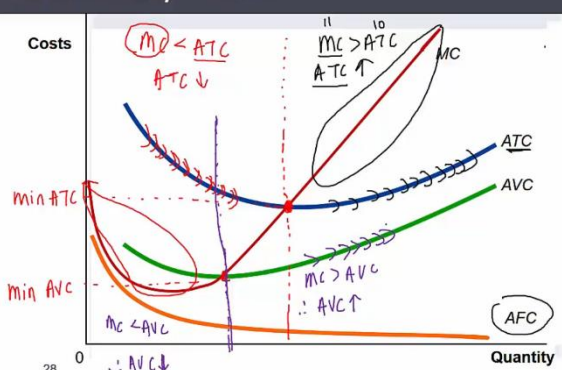
The increase in total cost that arises from an extra unit of production. Slope of TC.

$$MC = \frac{\Delta TC}{\Delta Q}$$

- When MP is maximum, MC is minimum.
- MC is inverse of MP.



Typical SR Cost Curves That We Traditionally Sketch



Minimum ATC is the point of **efficient scale**.

Firm is operating at **capacity** (efficient Q^* capacity) – just the right amount of output.

Changes in Short Run Costs

Fixed Costs Increase: AFC and ATC increase
Shift SC cost diagram UP

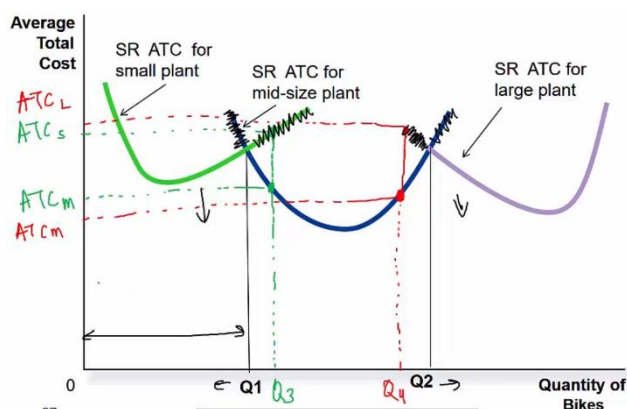
Variable Costs Increase: VC, MC, TC increase
The AVC, MC and ATC curves will shift up.

Costs in The Long Run

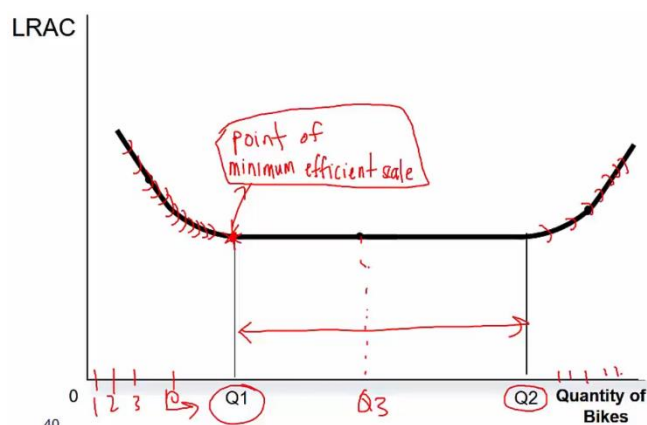
In SR, factory cost is fixed.

In LR, factor cost is variable.

For every LR, there's an associated SR.



LRAC = Envelope of the SR Costs



Scale Economies in the LR

Different levels of output place firms on different points on their LRAC curve.

Increasing production can have different impacts on cost.

Increasing Returns to Scale (IRS): Long-run average total cost falls as Q increases.

Decreasing Returns to Scale (DRS): Long-run average total cost rises as Q increases.

Constant returns to scale (CRS): Long-run average total cost stays the same as Q increases.

- IRS: You increase inputs by factor X, you get more than an X increase in output.
- CRS: You get exactly an X increase in output.
- DRS: You get less than X increase in output.

If a firm is experiencing IRS, it can lower its average costs by producing more output.

If a firm is experiencing DRS, it can lower its average costs by cutting back on production

Summary of Production Costs		
Term	Definition	Mathematical Description
Explicit costs	Costs that require an outlay of money by the firm	—
Implicit costs	Costs that do not require an outlay of money by the firm	—
Fixed costs	Costs that do not vary with the quantity of output produced	FC
Variable costs	Costs that do vary with the quantity of output produced	VC
Total cost	The market value of all the inputs that a firm uses in production	$TC = FC + VC$
Average fixed cost	Fixed costs divided by the quantity of output	$AFC = FC/Q$
Average variable cost	Variable costs divided by the quantity of output	$AVC = VC/Q$
Average total cost	Total cost divided by the quantity of output	$ATC = TC/Q$
Marginal cost	The increase in total cost that arises from an extra unit of production	$MC = \Delta TC / \Delta Q$

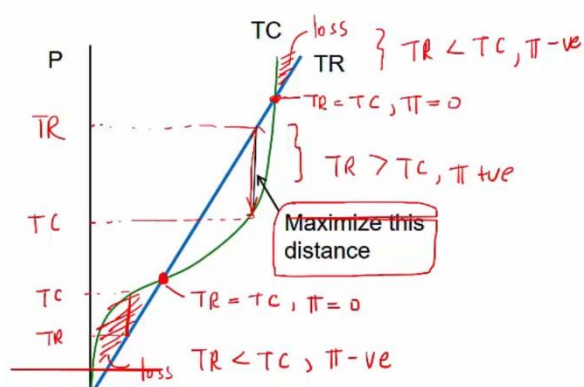
Chapter 8 – Perfect Competition

- Many buyers and sellers in the market
- Goods are homogeneous
- Firms freely enter and exit the market
- No barriers to entry

Market demand and supply determine price

Every firm takes the market price as given – they are Price Takers. Monopoly is Price Setters.

Price is given, quantity is variable. Linear TR graph for a firm.



Average Revenue (AR): Revenue firm receives for a typical unit sold.

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

Marginal Revenue: Change in total revenue from an additional unit sold.

$$MR = \frac{\Delta TR}{\Delta Q} = \text{Slope of TR function}$$

MR = P for perfectly competitive firm

Profit Maximization

$$P = AR = MR$$

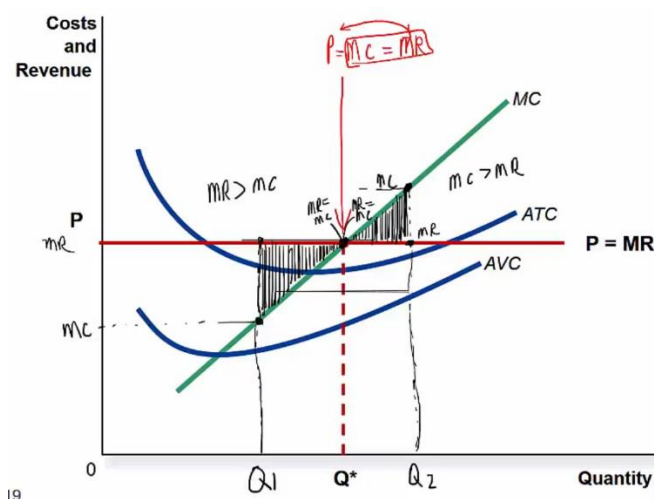
If profit is equal at two points, if $MR > MC$, they should create the extra quantity.

If $MR < MC$, they should make less.

A profit maximizing firm will produce a quantity of output where $MR = MC$.

Why make this? They want a customer base. They want more loyal people buying their products.

Firms will produce $P = MR = MC$ in perfect competition. A graph, set $P = MC$ to find what Q is.

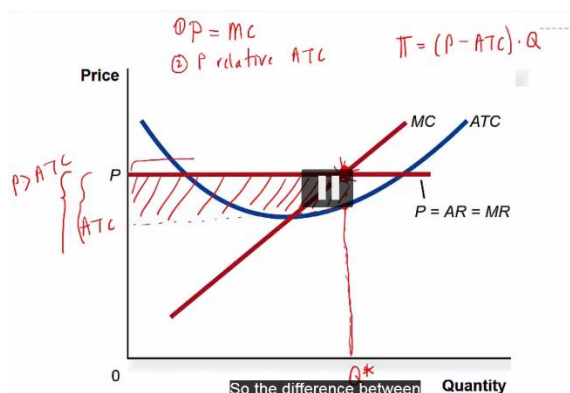


Since $P = MC$, it is actually the MC curve that determines Q. **Therefore, a firm's supply curve is its MC curve in the short run. Relation between P and Q through MC**

$$\pi = (P - ATC)Q$$

$$\pi = TR - TC$$

- $P > ATC$ = Positive Economic Profit
- $P < ATC$ = Negative Economic Profit Loss
- $P = ATC$ = Zero Economic Profit Normal
 - Firm is still making AP



Q^* is also the loss-minimizing quantity.

$P = \min ATC = \text{Breaking Point}$

Short Run Shutdown Decision

Sometimes a firm will choose not to produce anything at all.

It may choose to temporarily shut down in the SR because of market conditions. Continue to pay fixed costs but not variable costs.

If a firm cannot cover variable costs, it will shutdown and cut its losses. Doesn't want to risk losing customers so it will stay open even if breaking open.

Shutdown if $TR < TVC$ or $P < AVC$

Firm's SR Supply Curve is the portion of the MC curve that lies ABOVE minimum AVC. Below this, they shutdown.

Long Run Exit and Entry

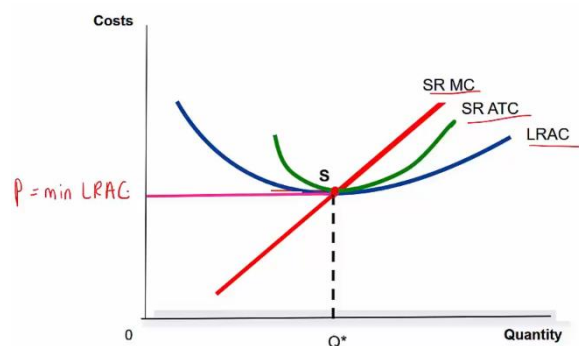
In LR, all costs are variable, so are average total costs.

A firm will want to exit an industry completely if the revenue it earns is consistently less than its costs.

Will exit if $TR < TC$ or $P < ATC$

If P consistently $> ATC$, firms will enter the industry. High Economic Profits.

When $P = \min ATC = \text{normal}$, there is no entry into or exit out of the industry. LR equilibrium in the industry.

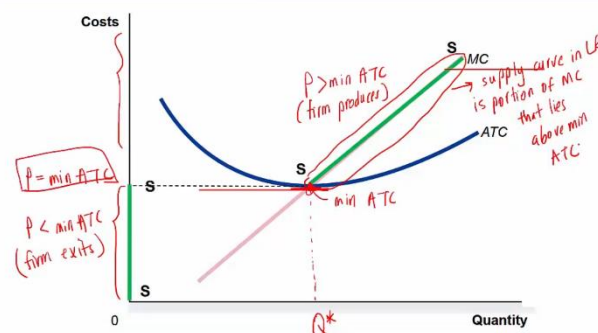


Long Run Supply

It produces Q based on $P = MC$ when $P > \min ATC$.

Exits and produces 0 when $P < \min ATC$.

The Firm's LR Supply Curve



Firm's Demand

Demand curve is perfectly elastic when perfectly competitive.

$P = AR = MR = D$

Above market Price, $D = 0$ $Q = 0$

SR Market Supply

The sum of the quantities supplied by the individual firms in the market.

Reflects the individual firms' MC curves.

Entry continues until $P = \min ATC$ and profit is driven back down to 0.

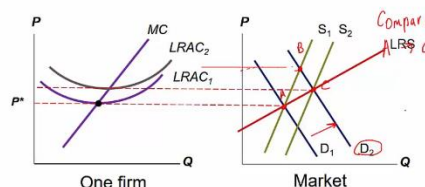
LR Market Supply

As more firms enter an industry, the costs of production may increase.

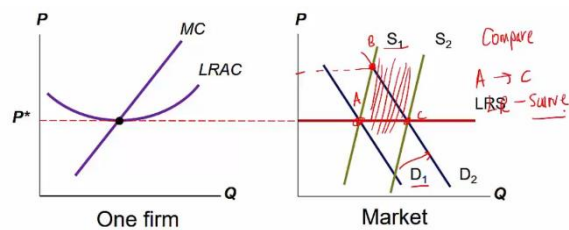
This is an **increasing cost** industry.

With higher costs, as more output is produced, firms need higher prices to produce more.

The market supply curve = upward sloping.



If costs do not change, this would be a **constant cost** industry. The long run market supply curve would be horizontal at Min AC.



$$\frac{\text{Market } Q}{\text{Firm's } Q} = \# \text{ of Firms}$$

Chapter 9 – Monopolies

Characteristics of monopoly:

- One seller
- No close substitutes
- The firm = **price setter**

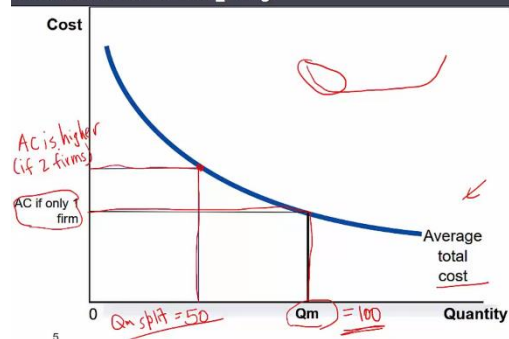
Why Monopolies Arise

The basic reason for monopoly is **barriers to entry**:

- 1) A single firm owns a key resource that no other firm can access or has a close substitute for.
- 2) The government gives one firm the exclusive right to produce and sell some good. Patents and copyrights.
- 3) An industry is a natural monopoly when a single firm can supply a good or service to an entire market at a lower cost than could two or more firms. Economies of scale. Downwards sloping part of LTcurve

It's more efficient if the monopolist supplies the entire market – it would be cheaper:

Economies of Scale as a Cause of Natural Monopoly



Monopoly P and Q Decision

A monopoly is the only seller and has to service the entire market.

Its demand curve IS the market demand curve. So, the monopoly faces a downward sloping demand curve.

$$\text{Total Revenue: } P * Q$$

$$\text{Average Revenue: } P$$

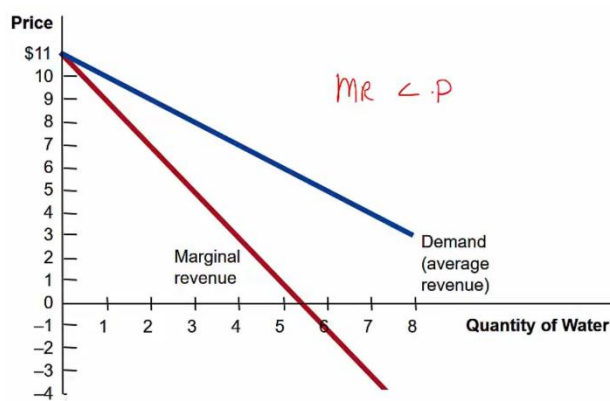
$$\text{Marginal Revenue: } \frac{\Delta TR}{\Delta Q}$$

If a firm wants to **increase** the **Q sold**, it has to lower its **P**. Since **D-Curve** is downward sloping. It gets less revenue for each additional good it sells.

So, MR is always less than P. $MR < P$

The **profit-maximizing** monopolist will always choose to produce a level of output **Q** such that: **MR = MC**

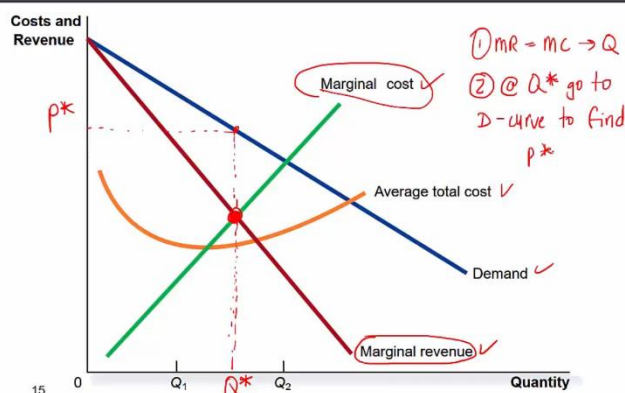
MC < P = A Mark-Up



A monopoly maximizes profit by producing **Q** where **MR = MC**.

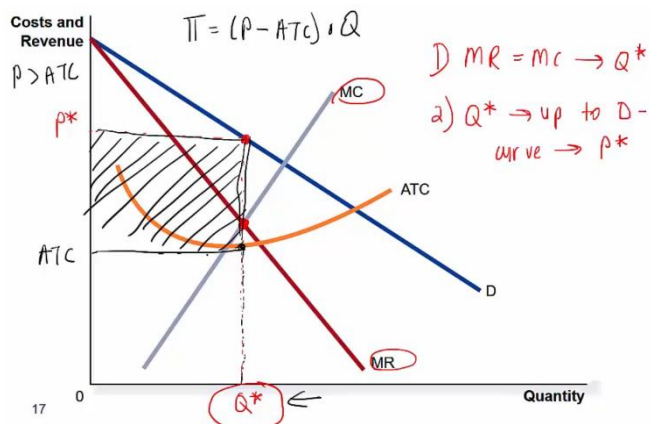
It then uses the demand curve to find the price that will induce consumers to buy that quantity.

Profit Maximization for a Monopoly



The Monopolist's Profit

$$\pi = TR - TC = (P - ATC)Q$$



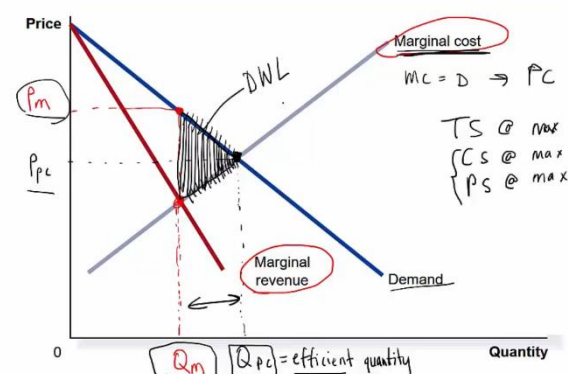
Deadweight Loss Due to Monopoly

In contrast to a competitive firm, the monopoly charges a $P > MC$.

Consumers: Monopoly undesirable

Owners of the firm: Monopoly very desirable.

Monopoly Versus Competition



The Inefficiency of Monopoly

Competitive equilibrium maximizes TS.

It sells where $P = MC$

Competitive outcome = Socially efficient Q

Monopolist produces less than the socially efficient Q and charges a higher price.

Loss in total surplus in the market.

Public Policy Towards Monopoly

1. Competition Law: Not letting mergers ruin competition
2. Regulation: $P = MC$ or ATC . May subsidize some firms so they don't exit.
3. Public Ownership: Crown corporations – not efficient as possible since it's public.
4. Doing nothing: If the inefficiency is small, they can stay out of it. May be political reasons for them to not get involved.

Price Discrimination

Practice of selling the same good at different prices to different customers.

Costs for producing for the two customers are the same.

In order to price discriminate, the firm must have some **market power** and be able to **segregate the market** according to consumers' willingness-to-pay.

First degree:

Also called perfect price discrimination. If the monopolist knows *exactly* the WTP of each customer, it can charge each customer a different price = their WTP.

- No consumer surplus.
- $PS = \text{Total Surplus}$
- No DWL Stop producing at $MC = D$
- Price Setter

- Can produce more than its Q^*
- Benefit for the firm only

Second degree:

All consumers pay the same price, but the price varies depending on quantity purchased.

Third degree:

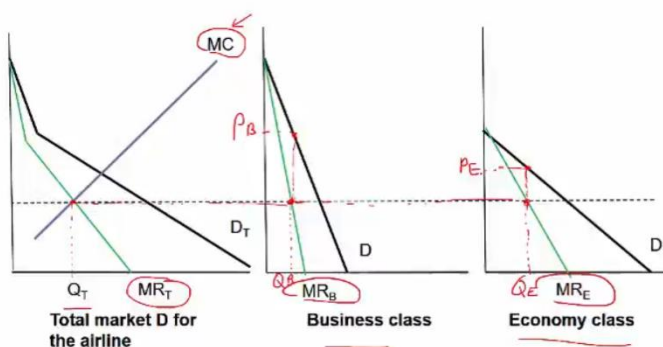
Also called ordinary price discrimination.

Usually, a firm can distinguish between different markets for its good.

It can then charge different prices in each market. Sets aggregate $MR=MC$, gets price from each market's demand curve.

If firm can segment its market, it will charge a higher price in market with more inelastic demand. People who can't shop around and need it asap.

Eg: Movie tickets, Bus fares, Discount coupons, Financial aid



Monopoly Supply Curve

A monopolist doesn't have a clear relationship like a perfectly competitive firm's SR supply curve.

It chooses Q where $MR=MC$ and *then* chooses P . Monopolist does not have a supply curve!

Chapter 10 – Monopolistic Competition

“imperfect competition”

- Many sellers
- Product differentiation: Each firm's product is at least slightly different from another firm's.
- Free entry and exit
- Firms are price setters to some degree.
- Downwards sloping demand curves

Maximizing Profit

A monopolistically competitive firm Produces where its $MC = MR$ and charges a price based on demand.

In the SR, a mc firm **behaves just like a monopolist**. Will exit if making a loss.

Entry by New Firms

SR economic profits encourage new firms to enter the market. ($P > ATC$).

- Increases the number of products offered
- Reduces demand faced by firms already in the market
- Existing firms' demand curves shift to the left. MR shifts with it.
- Existing firms' profits decline

Exit by Existing Firms

SR economic losses encourage firms to exit the market.

- Decreases the # of products offered.
- Increases demand faced by the remaining firms.
- Shifts the remaining firms' demand curves to the right. MR shifts too.
- Decreases any loss in profit remaining firms were experiencing

When Entry and Exit Stops? Tangency

Firms will enter and exit until the firms are making exactly zero economic profits, just like perfect competition. $P = ATC$

- In PC, $P = \min ATC$
- In MC, $P = ATC$
- **Long Run when $P = ATC$**

Characteristics of Monopolistic Competition

- As in a monopoly, price exceeds marginal cost. $P > MC$
- As in a competitive market, price equals ATC in the LR equilibrium.

One big difference between PC and MC is the Q produced in the LR. MC firms produce at a level we call **excess capacity**. They produce a level of Q where ATC is above min ATC, unlike PC firms.

Excess Capacity: Difference between Efficient Scale Q and Q Produced.

Advertising

Because $P > MC$, an extra unit sold at the going price means more profit for the monopolistically competitive firm.

They want more firms, so they will advertise

Ad Critics:

- Firms advertise in order to manipulate people's tastes
- Advertising impedes competition
- Saying products are different when they really aren't

Ad Defenders:

- Advertising provides info to consumers
- Advertising increases competition by offering a greater variety of products and prices.
- The willingness of a firm to spend money on advertising may signal to consumers that product is of high quality.

In the SR, firms resemble monopolies.

$P > MC$: markup

In the LR, firms resemble perfect

competition. $P = ATC$, profit = 0

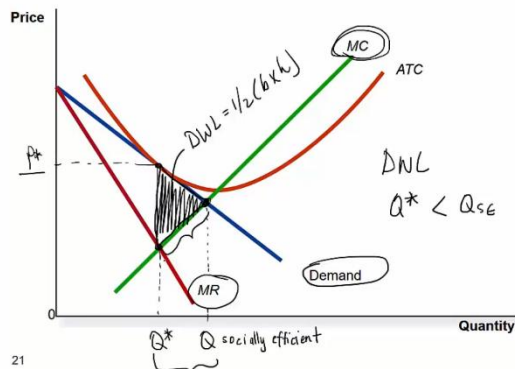
Deadweight Loss (DWL)

Just like monopoly, there are DWL due to monopolistic competition that make it socially inefficient.

Socially efficient: $P = MC$

DWL: $Q^* < Q_{se}$

DWL in Monopolistic Competition



Chapter 11 – Oligopoly

Imperfect competition: Monopolistic and Oligopoly. Between perfect competition and monopoly.

Oligopolies have:

- Few sellers, usually big firms
- Homogeneous or nearly identical products
- Interdependent firms

Duopoly

An oligopoly with only two members. They work together to act as a monopoly. They maximize profit between them and split said production.

Collusion: Agreement among firms in a market about quantities to produce or prices to charge.

Cartel: A group of firms acting in unison.

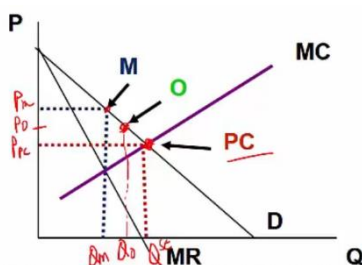
Problem with collusion is the temptation to break the deal, cheat, and make more.

Duopoly: with monopoly agreement, profits are maximized. Each acts in their own best interest causing a **suboptimal outcome**. They settle in at this **NASH Equilibrium**.

Nash Equilibrium: Economic actors interacting with one another, each choose their best strategy given the strategies that all the others have chosen. Always results in a suboptimal outcome.

$$P_m > P_o > P_c$$

$$Q_c > Q_o > Q_m$$



As the number of sellers in an oligopoly grows larger, an oligopolistic market looks more and more like a competitive market. Price approaches marginal cost, and quantity produced approaches socially efficient level.

Game Theory

The study of how people behave in strategic situations.

Strategic Decisions: Each person, in deciding what actions to take, must consider how others might respond to that action.

Prisoner's Dilemma

Provides insight into the difficulty of maintaining cooperation.

Pay-off Matrix illustrates the choices available in a scenario.

A **dominant strategy** is the best strategy for a player to follow regardless of the strategies chosen by the other players.

Cooperation is not in the best interest of the *individual* player – cheating is.

Self-interest makes it difficult for an oligopoly to maintain a cooperative outcome with low production, high prices, and monopoly profits.

Most games are repeated games, played over time with the same competitors. Firms that care about future profits will cooperate in repeated games rather than cheating in a single game to achieve a one-time gain.

Public Policy Toward Oligopolies

Cooperation undesirable from the standpoint of society as a whole – leads to production that is too low and prices that are too high.

Canada's Competition Act makes it **illegal to collude**.

Most collusion is **tacit collusion**:

- No formal agreements (paper trails)
- Just an "understanding" among firms

Tacit collusion is difficult in practice:

- Complex pricing schemes and products make it hard to keep track of firms. Cheating tends to increase as the number of firms increases in a cartel.
- Firms disagree over what's a fair share of output for each firm.
- Buyers have bargaining power and demand a good deal or threaten to go elsewhere.

Some Controversial Practices

Resale Price Maintenance: Requiring a retailer to sell a good at a certain price determined by the wholesaler.

Manufacturer may do this because it wishes to keep resellers profitable, and thus keep the manufacturer profitable.

Distributors who invest in promoting the manufacturer's product are able to recoup the additional costs of such promotion.

A consistent higher price may signal high quality, brand name products.

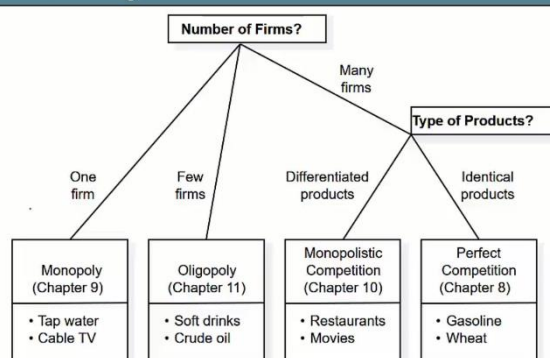
Predatory Pricing: Charging too low prices, hoping to drive out competitors.

If competitors or potential competitors cannot sustain equal or lower prices without losing money, they go out of business or choose not to enter the industry.

Most economists doubt that predatory pricing is a rational strategy. Eg Amazon

Tying: In order to purchase a good, you must purchase another good at the same time. Eg Banks

Four Types of Market Structures: A Summary



Chapter 12 – Markets for Resources

Factors of production: Inputs used to produce goods and services.

The 3 big factors:

- Land
- Labour
- Capital (Physical)

The Labour Market

- Governed by the forces of supply and demand.
- The market is perfectly competitive. Buyers and sellers are price-takers.
- Wage is determined by market supply and demand. Wage = Price of Labour (W)

Demand for Labour

When a firm decides how many workers to hire, it considers how much profit each worker would bring in.

The profit from an additional worker is their contribution to revenue minus their wage.

A worker's contribution (MP_L): What they add to total output in terms of goods and services.

The addition to total revenue of each good sold is MR.

Marginal Revenue Product, MRP:

$$MRP = MR \times MP_L$$

$$MRP = P \times MP_L$$

MRP diminishes as the number of workers rises because the market price of the good is constant.

As long as the contribution of a worker outweighs their cost, the firm will hire that worker.

To maximize profit, the competitive, profit-maximizing firm hires workers up to the point where:

$$W = MRP$$

MRP Graph (Labour Demand)

MRP is the demand curve for labour.

As wage increases, demand for labour decreases. Downward sloping.

A change in W is a movement along the labour demand curve.

Shift Factors:

- 1. Change in P of good.**

Since $D = MRP = P \times MP_L$

If P^{\wedge} , D^{\wedge} and curve shifts right/up

If P_v , D_v and curve shifts left/down

- 2. Changes in supply of other factors.**

If something changes MP, the curve will shift left/right.

- 3. Technological Change**

Advances that increase the MP of Labour will shift demand right.

Supply of Labour (Upward Sloping)

The labour supply curve reflects workers' decisions about the labour-leisure trade-off.

The opportunity cost of leisure = an hour's wage.

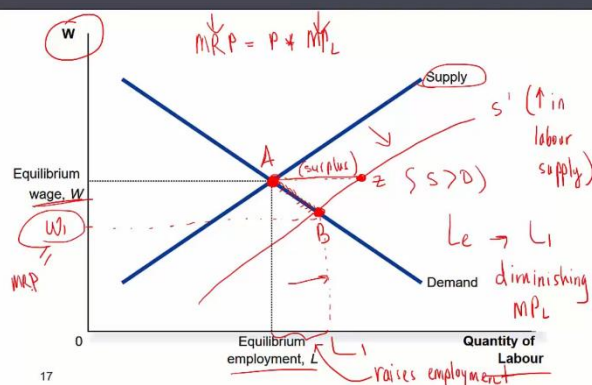
The higher the wage, the more expensive leisure becomes and the more work hours an individual is willing to supply.

A change in W is a movement along the labour supply curve.

Shift Factors:

1. Changes in attitudes
2. Changes in alternative opportunities
3. Immigration

Labour Market Equilibrium



MRP is lower at point B than A.

Other Resource Markets

Prices of Land and Capital:

The **rental price** is what a person pays to use a factor of production for a limited period of time. You expect that the capital will wear and tear and won't last forever.

Rental price of land and the rental price of capital are determined by supply and demand.

The firm **increases** the **quantity hired** until the **MRP = Factor's Price**

The Market for Capital

A firm will hire capital at the point where:

$$\begin{aligned} \text{MRP} &= \text{Rental Price} \\ &= \text{Price} \times \text{MP}_{\text{capital}} \end{aligned}$$

Hiring capital and land are generally longer-term investments. Labour is short-term.

How much to pay depends on the current value of the MP and the MRP expected to prevail from the future.

Present Value

Amount of money needed today to produce a given amount of money at a specified future date, accounting for the prevailing interest rate.

Interest plays a key role.

$$PV = \frac{x}{(1+i)^t}$$

x = amount you want to receive in period of time t

Annual payment is called a **coupon payment**, denoted C .

$$PV = \frac{C}{1+i} + \frac{C}{(1+i)^2} + \dots + \frac{C+x}{(1+i)^t}$$

Capital Purchase

When it comes to spending money to buy capital, a firm will choose the investment that has the highest present value.

If the PV is less than the Cost of the Machine, you would not buy the machine.

Only worthwhile for a firm to buy a piece of capital if the PV of the stream of future returns (MRP) exceeds the purchase price.

Chapter 13 – Consumer Theory

Utility

Consumers derive satisfaction from consuming goods and services.

Consumers try to maximize their utility from consuming various bundles of goods and services.

The set of all G&S an individual consumes is their **Consumption Bundle**.

Consuming various amount of G&S will give different levels of **utility**.

A **utility function** gives the **total utility, TU**, generated by a consumption bundle.

To measure utility (an abstract concept) we use units called **utils**.

$$\text{Marginal Utility, } MU = \frac{\Delta TU}{\Delta Q}$$

MU is the slope of the Total utility function.

Diminishing MU: Each additional good consumed adds less to TU than the previous unit consumed.

Maximized TU when MU = 0. Or the one quantity before MU goes negative.

The Budget Constraint

Two Constraints:

- Their income
- Prices of the goods

You can only buy what you can afford (without credit).

Budget Constraint, BC: Illustrates the limit on the consumption bundles that a consumer can afford given the constraints.

Any point on the BC Line indicates the consumer's combination or tradeoff between two goods.

BC gives combinations where the consumer is spending **all** of their income.

$$BC = P_x Q_x + P_y Q_y = \text{Income}$$

$$BC = \text{Sum}(\text{Expenditures})$$

$$Q_a = \frac{\text{Income}}{P_a}$$

$$\text{Slope} = -\frac{P_x}{P_y}$$

$$Y_{int} = \frac{N}{P_y} \quad X_{int} = \frac{N}{P_x}$$

- BC: 2 Goods You can Consume
- PPF: 2 Goods You can Produce
- Points outside of BC are not possible

P_x/P_y is the **relative price** of the two goods

- $P_x = 4$ $P_y = 2$ $P_x/P_y = 2$
You'd have to give up 2Y goods to get 1X good
- Price of Good X in terms of Good Y
(Opportunity Cost of Good X in terms of Good Y)

Changes to the BC

BC will change if income or prices change.

- Income increases -> BC shifts right
Both endpoints increase
- Income decreases -> BC shifts left
Both endpoints decrease
- Slope does not change -> Parallel shift

- Price(x) decreases -> BC gets flatter
Pivots/Rotates Outward
Good X endpoint increases to the right
Good Y endpoint doesn't change
Smaller Slope
- Price(x) increases -> BC gets steeper
Pivots/Rotates Inward
Good X endpoint decreases to the left
Good Y endpoint doesn't change
Larger Slope
- Price(y) decreases -> BC gets steeper
Good Y endpoint increases upward
Good X endpoint doesn't change
Larger Slope
- Price(Y) increases -> BC gets flatter
Good Y endpoint decreases downward
Good X endpoint doesn't change
Smaller Slope
- P(X) and P(Y) both change at the same rate, no change in income:
BC will have a parallel shift left/right.
- P(X) and P(Y) change at different rates, no change in income:
BC will rotate depending on the relative change in prices.

Marginal Utility per Dollar Spent

All the possible combos available are one's **budget set**.

Optimal Consumption Bundle: Maximizes a consumer's TU given their budget constraint.

A rational consumer will decide how to spend the marginal dollar. They want to add the most to TU that each dollar can buy.

The most MU per dollar spent in order to maximize TU.

$$\text{Marginal Utility/\$, } MUP = \frac{MU_x}{P_x}$$

If $MUP_x > MUP_y$: You will buy more X and fewer Y.

But buying more of X, the MU_x decreases and therefore $MUP_x < MUP_y$. This rotates back and forth until they are equal. Keep consuming X until they are equal.

TU is maximized when $MUP_x = MUP_y$

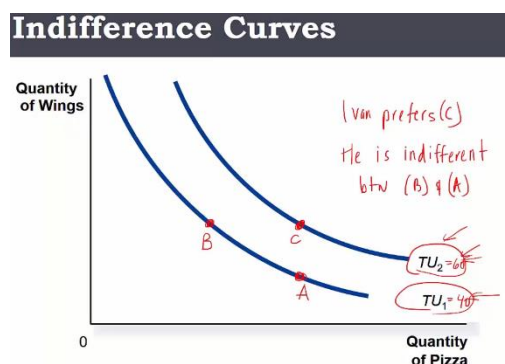
Consumer Preferences

A consumer can have various affordable combinations of goods that make them equally satisfied, making them indifferent.

We can graph these combos as **indifference curves, ICs**.

Every point on an IC has the same TU as every other point on the same curve.

Higher curves mean more goods in a combo and therefore greater total utility.



Best option is the furthest one from origin.

Marginal Rate of Substitution

The **slope** at any point on an **indifference curve** is the **MRS**.

Amount of good Y that a consumer requires as compensation to give up one unit of X.

The MRS depends on the MU of both goods.

$$MRS = \frac{MU_x}{MU_y}$$

Since the IC is negatively sloped, MRS technically will also be negative.

Properties of ICs

Property 1: Higher indifference curves are preferred to lower ones. Larger quantity of goods.

Property 2: Indifference curves are downward sloping. Consumers are willing to give up one good only if she gets more of the other good (to remain equally happy).

Property 3: Indifference curves do not cross

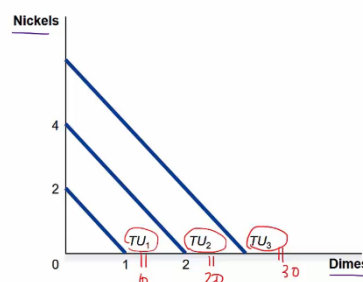
Property 4: Indifference curves are convex. People are more willing to trade away goods that they have in abundance and less willing to trade away goods of which they have little of. These differences in a consumer's MRS cause this curve to bow.

As more of one good is consumed, you prefer to give up fewer units of the second good in order to get more of the first good (you already have a lot, don't want more).

Perfect Substitutes (Property 5)

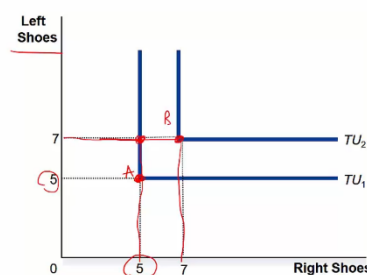
- Two goods with a straight-line indifference curves.
- The MRS is a constant number
- You always trade off one good for a fixed amount of another good.
- 2 nickels for 1 dime

Perfect Substitutes

Perfect Complements

- Two goods with right-angle indifference curves
- Goods consumed in a fixed proportion
- 1 right shoe, 1 left shoe
- Slope (MRS) = undefined

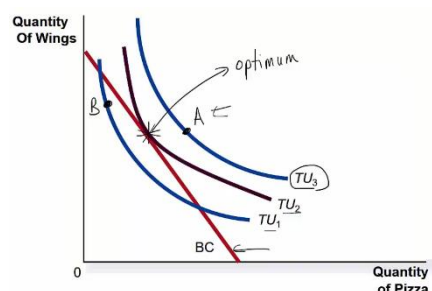
Perfect Complements



Maximizing Utility

Highest IC to maximize TU, but must be on/below budget constraint

Consumer optimum occurs when the highest IC and the BC are tangent.



|Slope of IC| (MRS) = |Slope of BC|

$$\frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

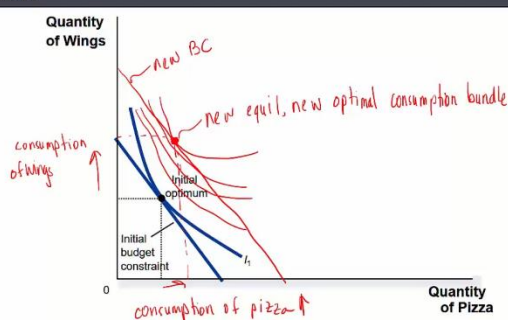
$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$$

How Changes in Income and Prices Affect a Consumer's Choices

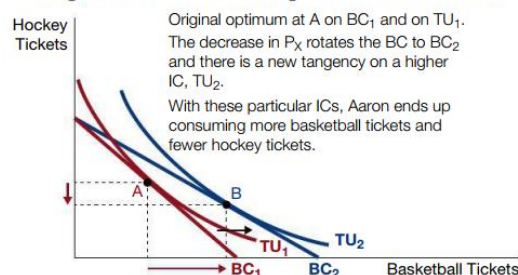
Increase in income shifts the BC outward

Consumer is able to choose a better combo of goods on a higher IC

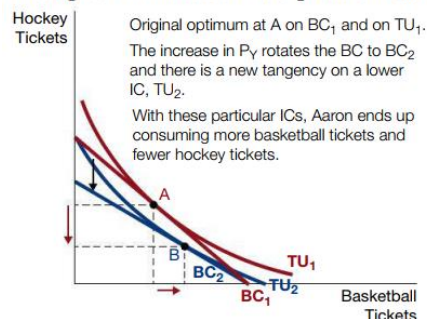
An Increase in Income: Ivan buys more of both



Example: A decrease in the price of basketball tickets, P_X



Example: An increase in the price of hockey tickets, P_Y

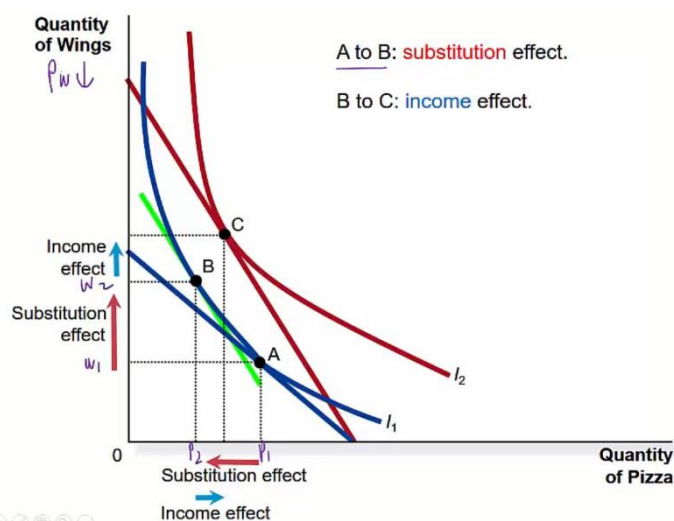


Income and Substitution Effects

A price change has two effects on consumption:

Substitution Effect: When a price change makes us consume more of a relatively cheaper good and less of the now relatively more expensive good. **Moves consumer along an IC.**

Income Effect: When a price change changes our purchasing power so that it feels like our total income has changed.



Income effect: **Gets you to a higher IC** since it feels like you have more money, but it's because the price of the good is just cheaper now. You have more buying power.

Deriving a Demand Curve

Determine how many of good Y is wanted at different prices to maximize TU.

This gives us demand for good Y

Do this for everyone and you will end up with the market demand for good Y

