

# Basics of Economics

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- Human wants for goods and services are unlimited (i.e. can never be fully satisfied) due to our greed
- Economics: study of how society allocated its scarce resources
  - o Two primary players in economics:
    - Producers
    - Consumers
  - o Economy: institution in which parties produce, consume and exchange
- Three primary resources - used by producers to make goods and services
  - o Land
  - o Labour
  - o Capital
  - o Limited resources + unlimited wants = scarcity
    - Fundamental conflict of economics
- Producers and consumers need to make choices (i.e. trade-offs)
  - o Opportunity cost: value of the option that was forgone in favour of the choice taken
    - Incurred with every choice made
    - Not necessarily a monetary (pecuniary) value
- Economy has 3 main coordination tasks that each firm needs to address
  - o 1. **What** goods and services should be produced & how much?
    - Profitable goods and services
  - o 2. **How** should we go about and produce them?
    - Least costly technique
  - o 3. For **whom** do we produce them?
    - For those who are willing and able to pay
- Market economy
  - o Decentralized allocative mechanism (i.e. price system)
    - Individuals have autonomy
  - o In-egalitarian
  - o Efficient
  - o Dynamic
    - Adjusts quickly to changes in the market
- Command economy (opposite of market economy)
  - o All centralized – all 3 questions addressed centrally
  - o Egalitarian (supposed to be)
  - o Inefficient
  - o Static
- Economic model – based on unproven assumptions
  - o Meant to describe workings of economy and make predictions
- Adam Smith
  - o Classical economist
  - o Coined idea of the “invisible hand” guiding the market to equilibrium
    - On basis of universal greed where producers want to increase prices and consumers want to decrease prices (i.e. my greed offsets your greed)
- Economics is a social (humans) science (methodical, empirical)
  - o Attempts to find evidence to prove it (& refutability is possible)
- Production possibilities frontier (PPF) OR transformation curve
  - o Negative slope due to scarcity
    - Graphic representation of the trade-off being faced for each unit of good produced
  - o Concave due to assumption that not all resources are suited to the production of both goods (i.e. resources are specialised)
    - Increasing opportunity cost
  - o Can contract inward (leading to layoffs, bankruptcy, etc.) or expand outward

- Combination to be chosen along the PPF is based on society's preferences
- 10 Principles of Microeconomics
  - 1. People face trade-offs
  - 2. The cost of something is what you give up to get it
  - 3. Rational people think at the margin
  - 4. People respond to incentives
  - 5. Trade can make everyone better off
  - 6. Markets are usually a good way to organize economic activity
  - 7. Governments can sometimes improve market outcomes
  - 8. A country's standard of living depends on its ability to produce goods and services
  - 9. Price rise when the government prints too much money
  - 10. Society faces a short-run trade-off between inflation and unemployment

# Interdependence and Gains from Trade

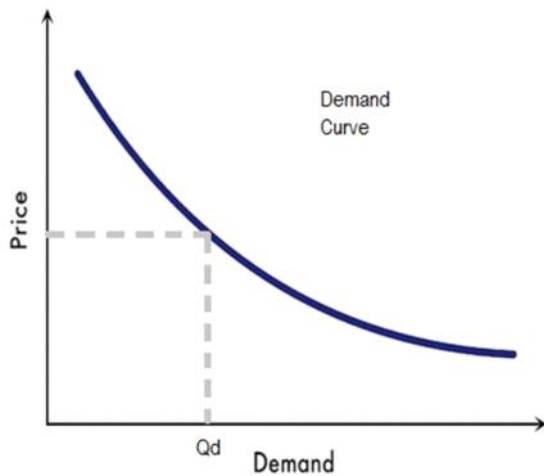
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- Usually good for producer to **specialize** in the production of one or few goods and services and trade their product away in exchange for product they do not specialize in
  - o International trade is economically beneficial
  - o Trade allows consumption beyond the PPF curve possible
- Autarky: economic system characterized by absence of free trade
  - o i.e. total self sufficiency
- Theory of competitive advantage: producer A has a comparative advantage over producer B if its opportunity cost of product good 1 over good 2 is lower than that for producer B
  - o See example in his slideshow
- Theory of absolute advantage: determined by pattern of absolute productivity (outputs ÷ inputs)
  - o Not relevant for trade and specialization

# Basics

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## - Demand



- Price is the most important factor
- Factors include:
  - Consumer preferences, income, price of related goods, expectations of future price, income, etc.
- Quantity demanded: total amount of good or service that all consumers are willing and able to buy given a price per unit of time
  - Specific point along horizontal (quantity) axis of the demand curve
- Demand: total relationship between price (P) and quantity demanded (Qd)
  - Graphically called the demand curve
  - Demand = Qd (P) (i.e. quantity demanded at each given price)
- Law of demand: ceteris paribus there is an inverse relationship between price and quantity demanded; as price increases quantity demanded decreases and as price decreases quantity demanded increases
  - Ceteris paribus: all other factors held constant
  - Means there is always a negative slope to the demand curve
- **Shifts** of the demand curve
  - Denotes a new relationship between Qd and dP
  - Depicted as a movement of the demand curve
    - Decrease – down and to the left
    - Increase – up and to the right
  - Caused by
    - Prices of related goods
      - Substitutes
        - $\uparrow P(\text{good B}) \rightarrow \uparrow D(\text{good A})$
        - $\downarrow P(\text{good B}) \rightarrow \downarrow D(\text{good A})$
      - Complements
        - $\uparrow P(\text{good B}) \rightarrow \downarrow D(\text{good A})$
        - $\downarrow P(\text{good B}) \rightarrow \uparrow D(\text{good A})$
    - Consumer income
      - normal good: a good which people buy more of when incomes increase and less of when incomes decrease
        - $\uparrow \text{income} \rightarrow \uparrow D(\text{normal good})$
        - $\downarrow \text{income} \rightarrow \downarrow D(\text{normal good})$
      - Inferior good: a good which people buy less of when incomes increase and

more of when incomes increase

- $\uparrow$ income  $\rightarrow$   $\downarrow$ D(normal good)

- $\downarrow$ income  $\rightarrow$   $\uparrow$ D(normal good)

- Consumer preferences

- If consumer preferences become more preferable  $\rightarrow$   $\uparrow$ demand

- If consumer preferences become less favourable  $\rightarrow$   $\downarrow$ demand

- Expectations of future prices and others

- **Movement along** the demand curve

- 

- ONLY caused by changes in price

- Supply



- Represents behaviour of firms

- Quantity supplied: total amount of good or service that firms are willing and able to sell given a price per unit of time

- Specific point along horizontal (quantity) axis of the supply curve

- Supply: total relationship between price (P) and quantity supplied (Qs)

- Graphically called the supply curve

- Supply = Qs (P) (i.e. quantity supplied at each given price)

- Law of supply: ceteris paribus there is a direct relationship between price and quantity supplied; as price increases quantity supplied increases and as price decreases quantity supplied decreases

- Gives us positive slope of supply curve

- Change in price  $\rightarrow$  movement along the supply curve

- Change in cost of production or technology of production  $\rightarrow$  shift of supply curve

- Change in technology will result in a change in the cost of production meaning there is a new relationship between price and quantity supplied (i.e. more/less quantity supplied per price)

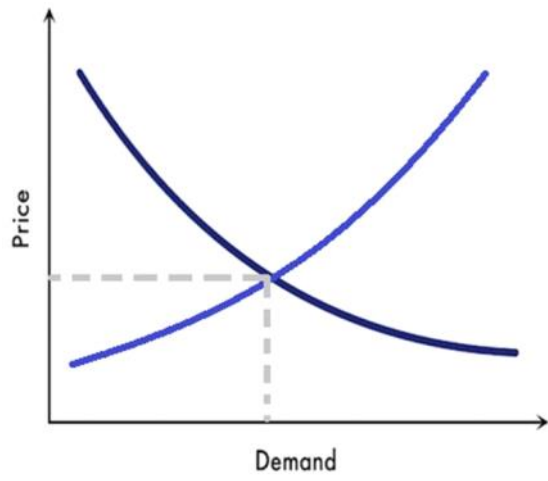
- Improvement in technology  $\rightarrow$   $\uparrow$ Supply (down and to the right)

- $\uparrow$ Cost of production (i.e. labour)  $\rightarrow$   $\downarrow$ Supply (up and to the left)

- $\uparrow$ Oil prices  $\rightarrow$   $\downarrow$ Supply for many suppliers (because many use oil)

- Results in a movement along supply curve ( $\uparrow$ Qs) for actual oil suppliers

- Supply and demand superimposition



- Intersection of demand and supply curves gives equilibrium price and equilibrium quantity of market

# Elasticity of Demand

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- Law of demand: as P increases Qd decreases
- Price elasticity: by how much does Qd change given a change in P (i.e. how responsive)

$$PED = (\% \text{ change in } Qd) / (\% \text{ change in } P)$$

- No units (scalar) because units of variables is \$ and they cancel each other out
- Always negative value due to negative slope of demand curve (law of demand)
  - o So just take absolute value
- Price elastic
  - o  $PED > 1$  (flatter)
  - o Consumers are responsive
  - o  $PED = \text{infinity}$  (undefined): perfectly elastic (horizontal demand curve)
  - o  $\% \Delta P < \% \Delta Qd$
  - o Independent food, long-term parking
- Price inelastic
  - o  $PED < 1$  (steeper)
  - o Consumers are unresponsive
  - o  $PED = 0$ : perfectly inelastic (vertical demand curve)
  - o  $\% \Delta P > \% \Delta Qd$
  - o Group food, short term parking, gasoline, cable, drugs, cigarettes
- Unitary elastic
  - o  $PED = 1$
  - o  $\% \Delta P = \% \Delta Qd$
- *Total Revenue (TR) = Price × Quantity*
  - o  $PED > 1$  then P increase → TR decrease
    - $PED = 2$
    - If P increases by 10% then Qd decreases by 20% and TR decreases by 20%
  - o  $PED < 1$  then P increase → TR increase
    - $PED = 0.5$
    - If P increases by 10% then Qd decreases by 5% and TR increases by 5%
  - o  $PED = 1$  then P increases → TR no change
    - $PED = 1$
    - If P increases by 10% then Qd decreases by 10% and TR no change
- Factors influencing PED
  - o Luxury goods vs. necessities
    - PED for necessities are lower (inelastic)
      - Gasoline, hydro, higher education
    - PED for luxury goods are higher (elastic)
      - Luxury cars
  - o Substitutes
    - More close substitutes will lead to higher PED (elastic)
      - Demand for gasoline is inelastic but demand for Esso gas is elastic because can get gas from other companies
        - o More specific usually → more elastic
        - o Broadly defined markets → less elastic
    - Definition of the market
  - o Large share of consumers' budgets
    - Goods taking up larger portion of budget tends to have a higher PED

- Thumbtacks – no one cares if price goes from 10¢ to 50¢
- Time
  - Long term → elastic
  - Substitutes become available after more time
  - Canada Post – over time more ways of sending messages developed (i.e. internet) so now delivery of paper mail is very elastic

# Elasticity of Supply

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- Analogous to price elasticity of demand

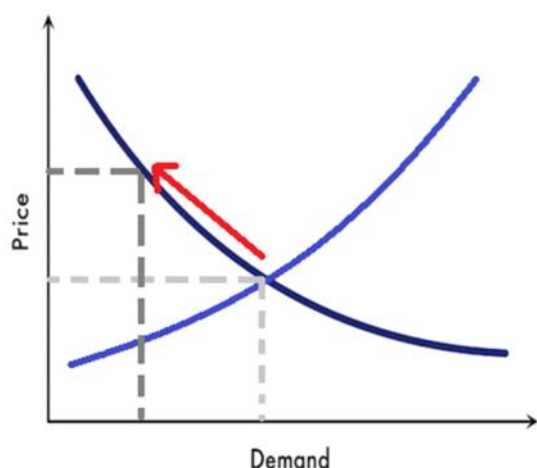
$$PES = (\% \text{ change in } Q_s) / (\% \text{ change in } P)$$

- Always positive due to law of supply
- Substitutes in production
  - o More substitutes (easy to switch making something to another thing) → elastic
  - o Disney junk
  - o agricultural crops (before seeds are sown)

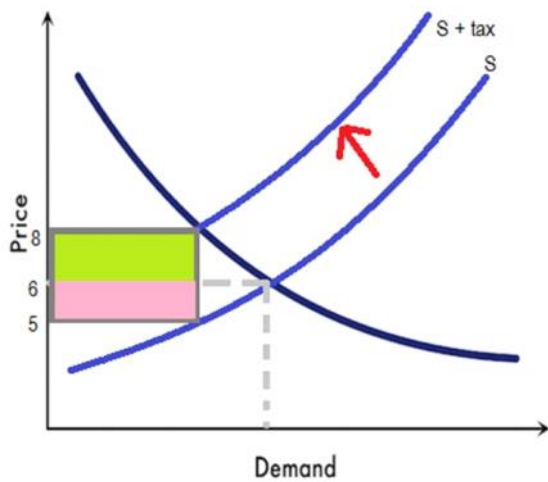
# Supply and Demand Analysis

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- Price ceilings: regulated price designed to protect interests of consumers
  - o Dictates maximum price for a commodity
  - o Rent control laws
    - Government decides rent prices aren't fair so intervention to provide affordable housing
- Price floor: regulated price designed to protect interests of producers
  - o Price is too low so dictate minimum price to prevent consumers from exploiting producers
  - o E.g. Ontario beer, some agricultural products (peanuts, honey), minimum wage (for low education/ training jobs)
    - Government legislates a fair price above equilibrium level
  - o  $\uparrow P \rightarrow \uparrow Q_s \text{ \& \ } \downarrow Q_d \rightarrow$  surplus – excess quantity supplied  $\rightarrow$  downward pressure on price
    - Unsustainable situation unless surplus (i.e. price floor) is removed
    - Government buys excess quantity (e.g. of peanuts and are given to schools as free lunch)
    - Wasteful (i.e. money spent on buying peanuts could have been spent on better things; opportunity cost)
- Supply management– alternative policy instrument to price floor
  - o Designed to support super-competitive prices in dairy and poultry industries
    - Super-competitive – above equilibrium
    - Sub-competitive – below equilibrium
  - o Industry chooses price level which guarantees high
    - $\rightarrow \uparrow Q_s \text{ \& \ } \downarrow Q_d$ 
      - Surplus is expected so output level is restricted to quantity consistent with price charged according to demand curve
  - o Illegal for
    - New farmers to enter market
    - Farmer to raise output
    - Importing foreign products (i.e. not domestic)
      - Allowing this would be devastating to supply management



- Moral – can't go against will of supply and demand and market
  - o Every action has a reaction – negative consequences result when tampering with price
- Tax incidence
  - o Revenue raised is never as much as forecasted because market shrinks whenever taxes are imposed
  - o Incidence of taxation falls on both
    - Producers – legal responsibility to remit tax to the government
    - Consumers – charged with tax for purchasing goods
    - Both parties share the burden of taxation

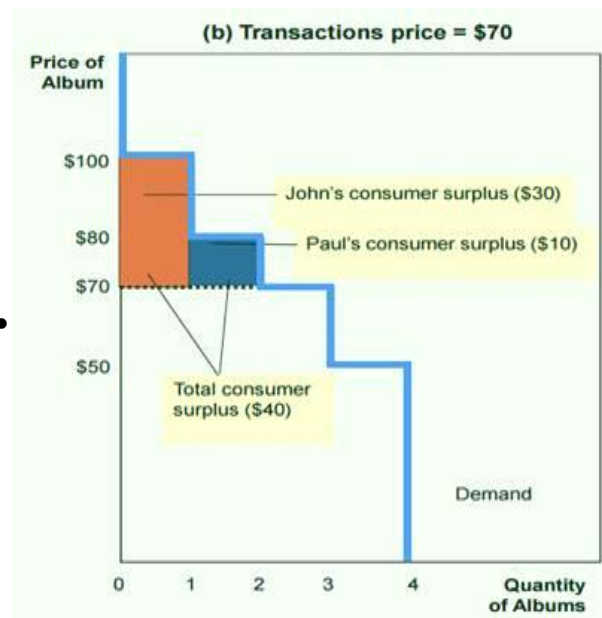


- If tax is imposed on sellers then firm has legal responsibility to pay → ↑cost of production → ↓supply (↑P required for each Qs, less Qs for each P) from S to S + tax
  - New equilibrium price and quantity where S<sub>tax</sub> intersects D
  - Revenue collected now based on a lower Q<sub>d</sub>
    - Important to note this is using the (unrealistic) assumption that there would be no other market response (would normally shrink)
- Diagram above represents result of supply-side tax of \$3 per unit
  - Gray box represents amount of tax revenue gained by the government (\$3 per unit)
  - Green area represents amount of tax burden on consumers (\$2 per unit)
  - Pink area represents amount of tax burden on producers (\$1 per unit)
- Result:
  - Consumers pay higher price (new price – old price)
  - Producers receive higher price but also need to pay the government so receive net less per unit than before
- Effect of elasticity
  - If supply is more price elastic than demand → suppliers will respond more to tax → consumers take more burden of taxation
    - Because sellers pass on most of tax as higher prices
  - If demand is more price elastic than supply → demanders respond more to tax → suppliers will take on more of burden of taxation
    - Because suppliers unable to pass on a lot of the tax as higher prices

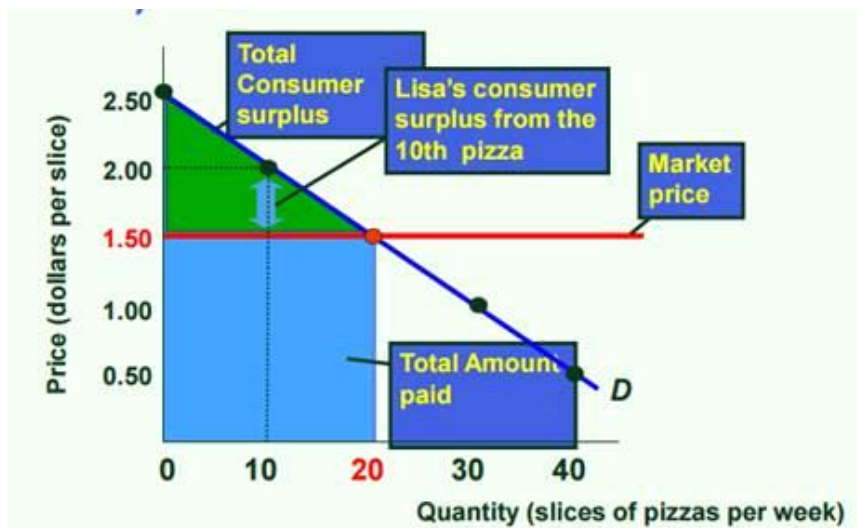
# Consumers, Producers and Efficiency

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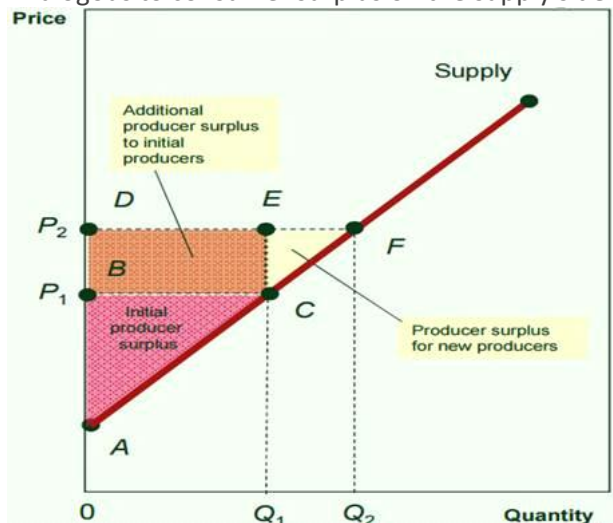
- Need to know behaviour of consumers to know demand curve
- Market demand is the aggregate (horizontal summation) of all individuals' demand curves
- Quantity is efficient if welfare of producers on supply side + welfare of consumers on demand side is higher than any other output level
  - o Consumer welfare = consumer surplus
  - o Producer welfare = producer surplus
  - o Global or total welfare = social or total surplus
- Welfare economics: how allocation of resources (inputs and outputs) affects economic well-being of consumers and producers
  - o Think of price as measure of consumer's willingness to pay given a quantity
    - As opposed to usual, quantity demanded/supplied given a specific price
  - o Differs across individuals
    - Those who value the good/service more (i.e. willing to pay more) on left (price higher for lower quantity supplied) and less (i.e. willing to pay less) on right (price lower for higher quantity supplied)
  - o Willingness of all consumers to pay decreases as quantity consumed increases
  - o Law of diminishing marginal utility: willingness to pay tends to decline within an individual as consumption level rises
    - Satiation point: where people don't want any more (even at price of zero, they are now satiated)
  - o Consumer surplus: measure of consumer well-being that reflects the payment rendered
    - Consumer surplus = willingness to pay – requirement to pay
      - Requirement to pay = total revenue



- o For each unit consumed it is the height of the demand curve minus the height of the transaction price
- o Can figure out slope by rise/run



- Consumer gets bonus counted in consumer welfare (except for marginal unit)
- As level of consumption rises, level of consumer surplus diminishes
  - Consumer surplus at margin is 0
  - E.g. should use implicit value of consumers in addition to revenue to justify expenditure on construction of light-rail transit
- Decrease in price will raise consumer surplus
- Producer surplus: measure of producer welfare
  - Producer surplus = actual price received – willingness to produce/sell
  - Area between supply curve and price
  - Analogous to consumer surplus on the supply side

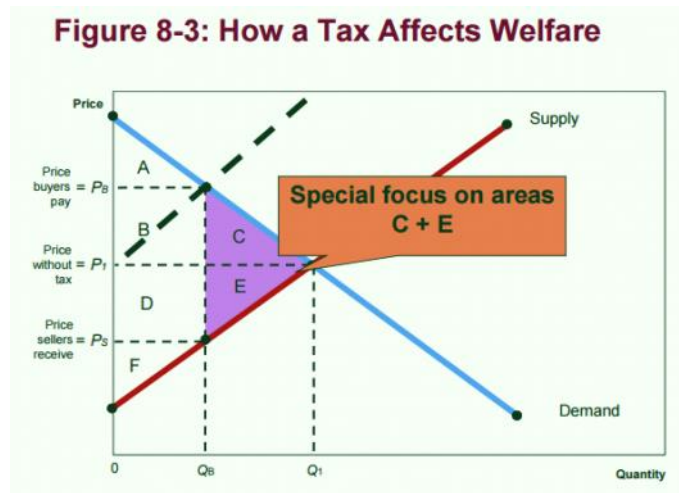


- Market efficiency
  - Consumer and producer surpluses used together to address efficient/desired allocation of resources
  - Total surplus (social surplus) = consumer surplus + producer surplus = willingness of demanders to pay – willingness of suppliers to sell
  - Efficiency: property of resource allocation of maximizing total surplus received by all members of society
    - Not just one or the other – no one actor of the market is considered more than the other
    - Refers to a quantity, not price
  - Equity: fairness of the distribution of well-being among the consumers and producer
  - Supply and demand equilibrium
    - Allocates supply to buyers who value them most
    - Allocates demand to suppliers who can produce at lowest cost
      - Don't want waste scarce resources with high opportunity cost
    - Has quantity of goods that maximizes total surplus, therefore is efficient
    - If quantity produced too low
      - Value to consumers to buy too high compared to cost to producers to produce

- If quantity produced too high
  - Cost to producers too high compared to value to consumers to buy
- Laissez-faire outcome
  - Thought by free market economists to produce efficient (welfare maximizing) output
  - Market failure when does not produce efficient output
    - E.g. market power, public goods

# Taxes

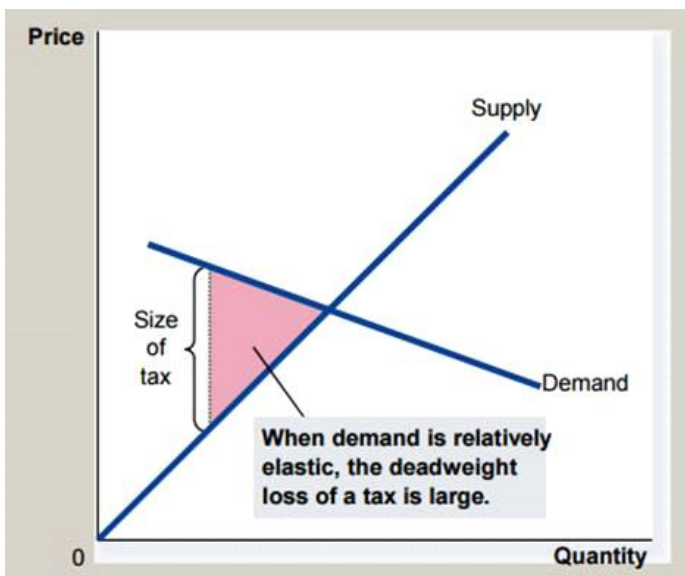
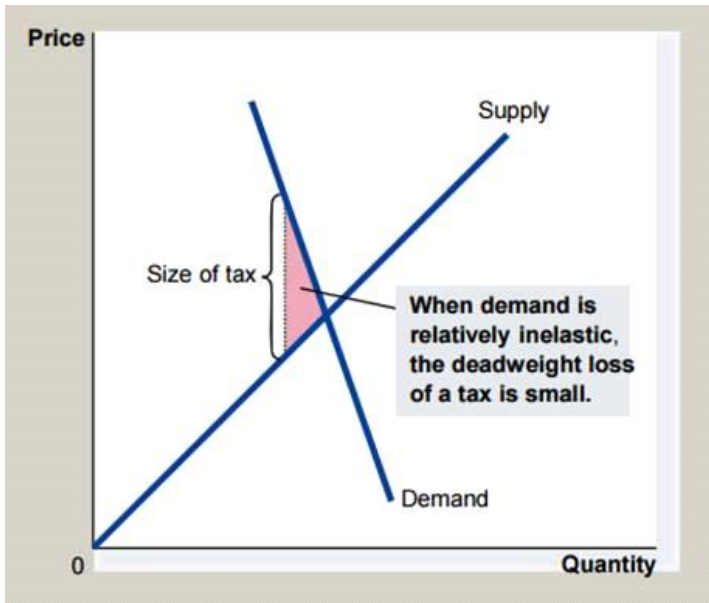
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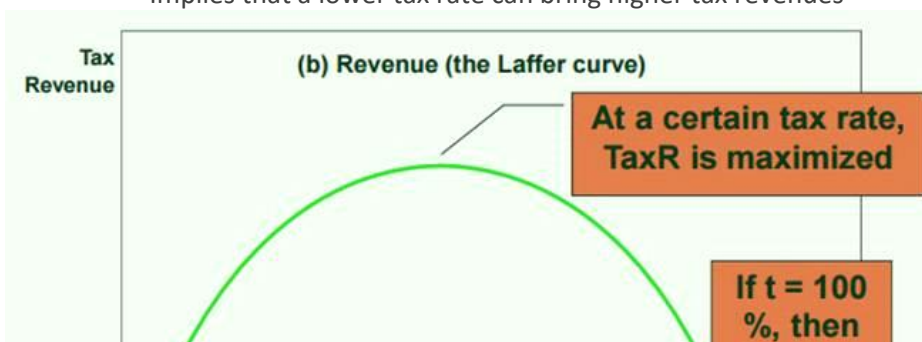
- If per unit excise tax  $\rightarrow \downarrow S$  (up and to the left to  $S'$ )  $\rightarrow \uparrow P'$  and  $\downarrow Q'$
- Welfare analysis – finding out who wins/loses from tax and by how much

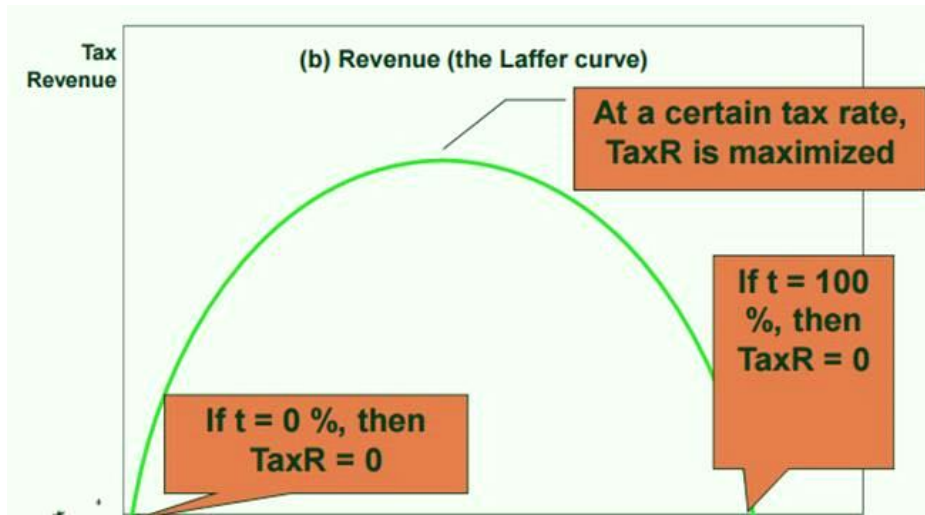
	Consumer Surplus	Producer Surplus	Tax Revenue	Total Surplus
Old (before tax)	$A + B + C$	$D + E + F$	--	$A + B + C + D + E + F$
New (after tax)	$A$	$F$	$B + D$	$A + B + D + F$
Net change	$-(B + C)$	$-(D + E)$	$+ B + D$	$-(C + E)$

- o Consumers lose, producers lose, government wins
- o Deadweight loss: net loss in total surplus
  - Occurs in this case after government implements tax (Area  $C+E$  represents deadweight loss in this market)
  - Equilibrium quantity lower than what was set by free market means new equilibrium is inefficient  $\rightarrow$  loss in welfare (taxes limit market activity that would occur in the free market)
  - NOT a suitable argument against taxes since tax revenues required to finance government services
    - But IS a suitable argument that tax revenue is not free – has consequences on economic activity
      - o Deadweight losses increase faster than increases in tax rates
        - Higher taxes cause increases losses in efficiency
  - Economists prefer harmonized sales taxes (low deadweight loss) over corporate taxes (high deadweight loss)
    - Cutting GST is bad because it would stimulate consumption only by a little and does not offset the reduction in tax revenues gained by the government
    - Cutting corporate income taxes is better because it would stimulate production and produce an overall superior outcome to cutting consumption taxes
  - Price elasticities of supply and demand affect efficiency of a tax



- Larger deadweight loss means smaller tax revenue (because market shrinks more so tax is collected from a smaller market)
- Political economy of taxation
  - Right wingers dislike taxation
    - Will claim that demand and/or supply are price elastic so deadweight losses will be high
  - Left wingers like taxation
    - Will claim that demand and/or supply are price inelastic so deadweight losses will be low
- Laffer (tax revenue) curve
  - States that as tax rates increase
    - Deadweight loss quickly grows larger
    - Tax revenues first rise then (as the market shrinks) fall
      - Implies that a lower tax rate can bring higher tax revenues





- Don't know how to find out optimal tax rate in real life

# Public Goods and Common Resources

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- Government sector instead of private sector; allocation of land, labour and resources
- Forces of supply and demand operate differently than they do in the private sector

Market Failure: (Why have a private sector at all?)

- Conservative free market economists: Markets are usually a good way to allocate resources
  - However, this is not always true<sup>^</sup>
- There are situations in which unregulated markets fail to bring about a socially desirable outcome (Market failure)
  - Competitive markets usually yield desirable outcomes
    - Efficiency, whereby the output level is such that  $MB = MC$
  - Market failure: Any situation in which a free market equilibrium (intersection of S & D) does not generate an efficient, socially desirable outcome
  - This type of situation can justify government intervention
- Left wing people: think markets usually fail; right wing people: believe the opposite
  - Highly generalised classification!!
- Several cases of market failure:
  - Public goods, externalities, monopoly and inequality

	<b>Excludable</b>	<b>Non-excludable</b>
<b>Rivalrous</b>	Private goods	Common goods
<b>Non-rivalrous</b>	Club goods	Public goods

Private goods:

- Rivalry in consumption
  - One person's consumption infringes upon somebody else's consumption of the good
  - When consumption are rivalrous, two or more people rival each other in a good or service and there is no joint consumption
- Excludability in consumption
  - It is possible to prevent someone from consuming it
  - He/she who pays for it gets to determine how to use it, those who do not pay are excluded from benefitting

Public goods:

- Distinction between private and public goods mainly lies on the D side (rather than the S side)
  - Contrast them between the private goods

- Non rivalry in consumption
  - Society consumes public goods jointly; two or more people can consume it in the same time
  - Consuming this specific good or service will not deter another person from also consuming the same good or service
    - Eg: Beautiful view, clean environment, highway before the saturation point is reached
- Non-excludability in consumption
  - We cannot exclude people from benefitting
  - We all benefit, but maybe not in the same extent
    - Eg: Skating on the canal, national defense, public security (law and order)
- Public goods are not free goods!
  - They are still economic goods, they have an opportunity cost
  - Financed from tax revenue
    - "Higher taxes on the rich"
- Hardly such a thing as a purely public good
  - People benefit from public goods in different extents

Common resources (third type of good)

- Hybrid between public and private goods
  - Rivalrous but non excludable
  - Not exactly the same thing as public goods
    - Eg: Fish in the ocean

Mixed goods: (Quasi public good)

- Goods with some public good features
- Eg: Public transportation
  - It's excludable in the sense that you have to pay a fare to ride
  - Non excludable, in theory we all benefit from public transit as it takes many cars off the road, lowers GHG emissions, lowers traffic and congestion

Free rider problem: when a person received benefit of a good but avoids paying for it

- E.g. someone wants to watch fireworks and most people contribute money to chip in the price to pay for the display but a cheapo doesn't pay and stays to watch anyway
- What is the best level of quantity (output) for a public good
- Causes market failure
  - Results in a public goods to be under produced by the private sector

- Similar to goods that have a positive externality
- With private goods, we can measure people's preferences according to their buying habits
  - The price that they are observed to pay is a good indicator of their true preferences
  - Put their money where their mouth is if they want to consume
- Free riding is lying; not contributing to the provision of the public good according to one's true preferences
  - People cannot be excluded from consuming, so in many cases they tend to underpay for public services
  - Not revealing their true preferences of how much it is really worth to them

#### Solution to free riding

- Government provision of the good/service financed by compulsory taxation
  - This will increase the production level closer to the socially optimal level
  - Often times, a fee is implemented for a public good (ie. With light houses), however the payments often fall short
    - Therefore there should be given a compulsory tax
- Illustrations:
  - Public education JK through grade 12
    - Childless people will question why they should pay for schools, they do not benefit, so why should they contribute anything
    - Translation: This is an excludable private good
    - Implication: They want to free ride
  - University education
    - Students: Why should we pay anything towards our education? It is society who benefits, not us. Taxpayers should finance all of it
    - Translation: This is a fully non-excludable, public good
    - Even those who don't use the system may benefit
      - Implication: They want to free ride, as do non-students who don't want to pay taxes for it
  - Fighting poverty or providing universal health care
    - Anti-poverty activist: Fighting poverty is a public good in that all of society benefits, not just the recipients
    - Translation: No one can be excluded from benefiting from anti-poverty campaigns, even the rich
    - Implication: All should be compelled to pay for them through taxation in order to avoid free-riding
- Mandatory taxation:
  - Addresses free riding
  - Provides remedies to the free rider effect

- When interest groups say there should be more tax \$ allocated to specific purpose, they are making a **public good** type of argument
- When you hear an interest group saying that fewer tax \$ should be allocate, they are saying that is a **private good**
  - If it that worthwhile, people will and should pay for it out of their own pockets
- Private goods: Free market equilibrium is the optimal level of provision
- Optimal provision of a public good:
- Use cost benefit analysis
  - Production costs are the same as with private goods
  - Benefit side is problematic to calculate due to free riding problem
    - Do not really know the value people put in place on the provision of a given level of output
  - Optimal provision for the community occurs at the output level where marginal benefit = marginal cost
- Fraught with difficulty and subjectivity in estimating the benefits
- In practice, mixed goods and public goods may be overproduced ( $MC > MB$ )
  - At least 40% of all economic activity in Canada is accounted for by the 3 levels of government
    - Some think that's too much, others think the opposite
- Ex: Global warming, the overall goal to reduce the temperature by 2 degrees Celsius
  - Public good: The reduction in the overall global temperature
  - Non-rivalrous in consumption, everyone will benefit from the reduction of temperature
  - Non-excludable, nobody can be excluded from benefitting
  - Most developed countries blame China and India for causing global warming and thus it should be their responsibility to reduce their emissions
    - Free riding such that they don't want to contribute their fair share to the cause

#### Common Goods: Tragedy of Commons

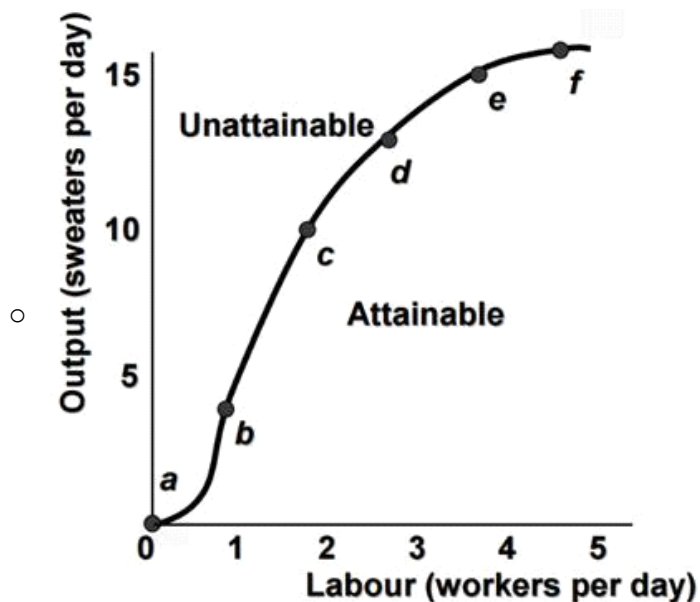
- Tragedy of the commons is the illustration of a common resource
- Case of non-excludability and rivalry in consumption
  - Most waters are public; can't exclude fishers from fishing in any country with international waters
- Any user imposes a negative externality on other uses cause every user has a incentive to over-exploit and little incentive to invest
- Collective ownership of public resources leads to over utilization and under maintenance
- Examples:
  - Over fishing; cod fishing no longer exists in Canada

- Husbanding of game or lack thereof; don't want a certain animal to go extinct
- Ie: Public green pasture that can be used for people to have their cattle graze there
  - Everyone rich and poor would use the place, but the green pasture eventually becomes unusable
  - Have to come to a point to fight for the pasture with their neighbours; come earlier, etc.
  - Everyone has an incentive to have their livestock eat all the grass
  - Over exploitation, little incentive for maintenance, nobody thought about tomorrow
- What to do?
  - Divide the land into parcels and either sell them or give them away such that they become private property that is excludable (its already rivalrous)
  - Turn a public good into private property; thus becoming excludable
  - Gives strong incentives for sustainability and for maintenance (sustainable exploitation)
  - In a case where the land is divided so small that is unusable, a diseconomy of scale arises; users may choose to combine land to form a club (such as golf clubs)
- To fix problem: Assign property rights
  - Confers to the owner the ability to use it as he/she sees fit
- It is the lack of assigned property that is at the heart of the externality and public good problem

# Costs of Production

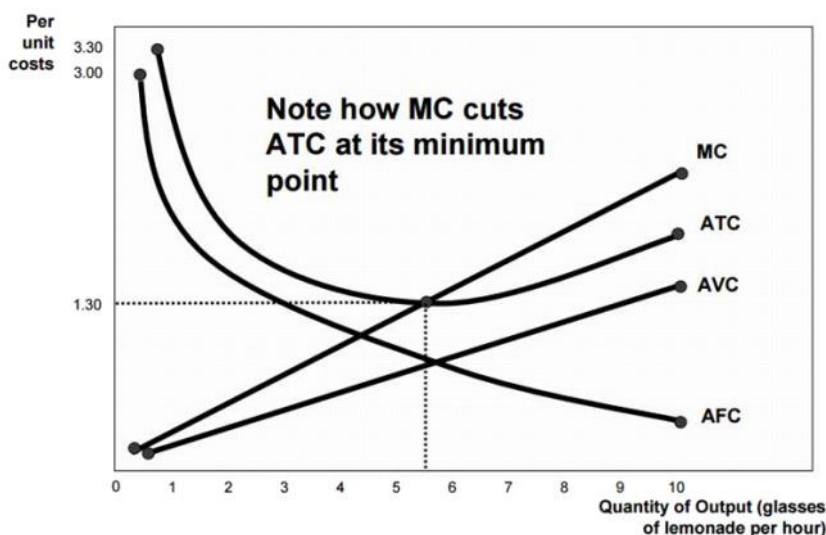
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- Profit = total revenue – total cost =  $P \cdot Q$  – total cost
  - o Explain difference between explicit and implicit costs
    - Explicit: firm needs to pay with capital (actual money)
      - E.g. payroll, rent, taxes, utilities
    - Implicit: opportunity costs associated with firm's inputs (do not require actual money payments)
      - Value of firm's inputs in alternative uses
      - E.g.
        - o Opportunity cost of workers' time
        - o Going rate of return on capital
          - Could have been earned if firm invested capital elsewhere
        - o Land could have been used for different crop
  - o Different kinds of profit
    - Economic profit = total revenue – explicit costs – implicit costs
    - Accounting profit = total revenue – explicit costs ONLY
    - Economic profit < accounting profits
- Economic point of view sees resource allocation as most important, not bottom line
  - o If economic profit > 0 then called "supernormal profits"
    - Means profits in this firm are greater than average throughout economy
      - Implies resources are used in a way that earns more profit than other uses
    - E.g. pharmaceutical companies
  - o If economic profit < 0 then called "subnormal profits"
    - Means profits in this firm are lower than average throughout economy
      - Implies different allocation of resources can earn more profit
  - o If economic profit = 0 then called "normal profits"
    - Return on inputs same as in other uses
    - Earning same profits as average in the economy
    - In this case accounting profit is definitely greater than 0
- Assume firm's main objective is the maximize profit ("shareholder values")
  - o Firm is the actor – how does it behave in a situation of scarce resources to maximize profit?
  - o Usually leads to downsizing and outsourcing (lots of layoffs) BUT brings about best economic outcome – should they be doing this?
    - Some agree – brings about best economic outcome
    - Some disagree – firm should practice CSR and avoid causing economic dislocation (assuming profits being made)
- Production functions
  - o Variable factor of production: varies with the level of output
    - E.g. energy, raw materials, labour
    - As production level increases, use of a variable factor increases
  - o Fixed factor of production: does not vary (i.e. is fixed) with the level of output
    - As production level increases, use of a fixed factor does not change
    - E.g. insurance services, plant building
  - o Technology of production
- New variables
  - o Output (total product (TP)) =  $f(\text{land, labour, capital})$ 
    - $TP = Q = f(\text{labour})$
    - Product as a function of labour
    - As amount of labour applied increases, output increases as well



- Similar to PPF
- Total product always increasing if labour continues to increase
  - But SLOPE decreases (rate of growth slows down) as output and input increase
    - Slope is not constant due to law of diminishing marginal returns
- When TP decreases, MP is negative
- Marginal product =  $MP(\text{labour}) = \Delta TP / \Delta \text{labour input}$ 
  - Increment to TP by hiring one more unit of labour
    - Contribution of last worker hired
  - $MP = d(TP) / dL$ 
    - Derivative of TP with respect to labour input
  - MP is generally not constant
  - Law of diminishing marginal product (DMP)
    - There must be a fixed factor of production and only variable factor is labour (therefore only applicable in short run since in long run all factors of production are variable, by definition)
    - As more of a variable factor is applied to a fixed factor, MP of the variable factor decreases (greater than 0)
    - Says nothing about negative MP
      - Assume firm won't go to the point where MP is negative (but possible in reality)
      - If  $MP < 0$  then extra increment of labour made firm worse than before they were hired
        - If  $MP = 0$  then extra increment of labour added did nothing
- Costs of production (goal is to derive supply curve) 2 components
  - Physical productivity
    - Using TP and MP
  - Prices for input factors (land, labour, capital)
    - I.e. costs of production
- Cost curves (costs of production)
  - 2 distinct types of costs
    - Variable costs of production: vary with changes in the level of production
    - Fixed costs of production: remain constant (i.e. are fixed) with changes in the level of production
  - Given the physical productivity and prices of inputs, one can derive the costs of production
    - Expressed in per unit of output (\$)
  - Diminishing MP = increasing per unit production costs
    - Because MP of labour decreasing due to decreasing MP while wage remains constant

- Important distinction
  - TP and MP are functions of the level of input
  - Cost functions are functions of the level of output (Q)
- Total cost =  $TC(Q) = TFC(Q) + TVC(Q)$ 
  - TFC: total fixed costs
  - TVC: total variable costs
  - TC and TVC increasing directly with level of production
    - Since variable cost increases with production increases and total cost would increase as a part of it (TVC) increases
  - Gets steeper and steeper
  - Original point (Y-intercept) is shut down point
    - Shutdown: quantity produced is 0 therefore only costs left are the fixed costs
      - Due to law of DMP
- Marginal cost =  $MC = \frac{\Delta TC}{\Delta Q} = \frac{\Delta TVC}{\Delta Q}$ 
  - Cost of producing the marginal unit
  - MC is the derivative (graph of the slopes) of the TC function
  - Slopes upward due to increasing slope of TC
  - Important relationship with ATC
    - As Q increases, if  $MC > ATC$ ; ATC, AVC increases as the level of output rises
    - As Q increases, if  $MC = ATC$ ; ATC, AVC is steady as the level of output rises
    - As Q increases, if  $MC < ATC$ ; ATC, AVC decreases as the level of output rises
  - Intersects ATC at its lowest point
- Average total cost =  $ATC(Q) = \frac{TC(Q)}{Q} = \frac{TFC + TVC}{Q} = AFC + AVC$ 
  - “saucer”-shaped
    - At lower levels of output, ATC falls due to falling AFC as Q increases
      - Spreads fixed costs over more units of production
    - At higher levels of output, ATC rises due to rising AFC as Q increases
  - Firm’s capacity is bottom point (where MC intersects)
    - Most cost-efficient level of output (efficient scale)
    - Not usually level of output that a firm will operate at



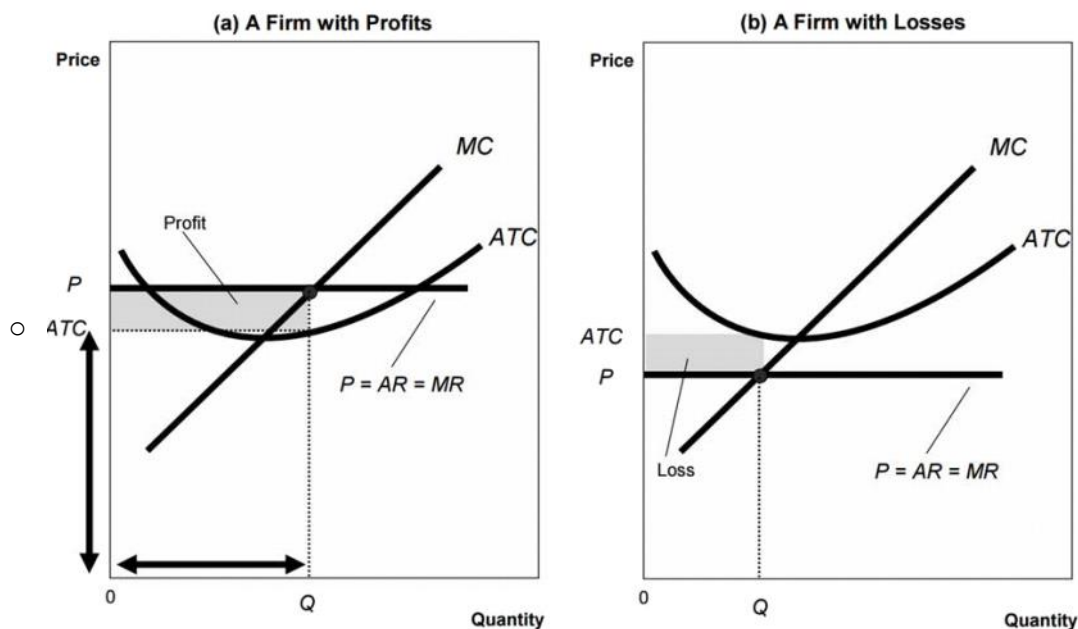
- Per-unit cost variables (MC, AFC, ATC, AVC) depend on operating level of the firm
- Cost curve factor changes
  - Movement along – occurs with a change in output level
  - Shift of
    - Shift down of ATC, AVC, TVC, TC (i.e. lower cost at each operating level)
      - When productivity improves or factor prices fall
      - When fixed costs decrease
    - Shift up ATC, AVC, TVC, TC (i.e. higher cost at each operating level)

- When productivity worsens or factor prices rise
  - When fixed costs increase
  - No change in MC, AVC, or TVC
- TVC, ATC, AVC, TC, MC
  - When variable costs change
  - No change in TFC or AFC
- Long run
  - Long run average cost (LRAC) curve
    - Lowest per-unit cost attainable when plant size is flexible (at each plant size)
    - 3 sections
      - Economies of scale: inputs doubled = outputs more than doubled
        - Negative slope, on the left side of the LRAC
      - Constant returns to scale: inputs doubled = outputs doubled
        - Flat, in the middle of the LRAC
      - Diseconomies of scale: inputs double = outputs less than doubled
        - Positive slope, on right side of the LRAC
        - (diseconomies of scale  $\neq$  diminishing marginal product)
          - Diseconomies of scale – only in long run
          - Diminishing marginal product – only in short run (fixed factor of production needed)

# Perfect Competition

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- Motivation
  - o Illustration
    - Rogers has a monopoly on cable television so prices are high
    - Rogers has competition for internet and phone services so prices are lower
- Market structure
  - o Final step to analyse market
    - Needed to derive supply curve
    - Places constraints on pricing behaviour of firms – needed to know which price and quantity firm will choose
- 4 features (assumptions) – no such thing as perfectly competitive market in real life
  - o Free entry into industry (little to no barriers to entry)
  - o Perfect information regarding prices and quality
  - o Identical product
    - Geographical locations go in here (no one more conveniently located)
  - o Many buyers and sellers
- New definitions
  - o  $TR = P \cdot Q$
  - o  $MR = \text{incremental TR obtained by selling one more unit of output} = \frac{\Delta TR}{\Delta Q}$
  - o  $AR = \text{revenue per unit sold} = \frac{TR}{Q}$
  - o  $P = MR$  always in perfectly competitive markets
    - Each unit of output sold = MR
    - So that TR increases by P for each unit of output sold
- Determining equilibrium price
  - o Firms in perfectly competitive markets are price takers – take whatever price is dictated by the market and charge only that price
    - Firms cannot charge higher price because
      - Too many other sellers for customers to go to
      - Homogenous product, no one better or worse than other
      - Perfect information, everyone knows going price and quality
    - Demand for each firm in competitive market is perfectly elastic (horizontal)
      - But demand in the market is regularly downward sloping
  - o Firm price is always the market equilibrium price
- Profit maximization (still assume firm is aiming for profit maximization)
  - o Firm cannot choose price but can choose level of output
  - o Occurs at output level where  $TR - TC$  is highest, where  $MR = MC$
  - o If operating at output other than  $MR = MC$  then
    - Profit not as high as possible
    - But does not necessarily mean a loss is being induced
    - If  $MR > MC$  then need to increase output
    - If  $MC > MR$  then need to decrease output
- Equilibrium profit
  - o  $\pi = TR - TC = Q(P - ATC)$ 
    - $(P - ATC)$  known as profit margin (average profit per unit)
      - If  $P > ATC$  then profits are positive
      - If  $P < ATC$  then profits are negative (losses)
  - o ATC depends on operating level of the firm
    - Take ATC corresponding to the level of output



- Where ATC is lowest is where costs are lowest but firm will probably not produce at that level – firm will probably operate at profit max

- With profits

- Height of profit rectangle ( $P - ATC$ ) is profit margin
- Area of the rectangle ( $Q * (P - ATC)$ ) is total profit
- IMPORTANT: do not use ATC min to calculate profits, use where Q intersects ATC

- With losses

- Firm will still operate at  $MC = MR$
- Area of rectangle represents losses made by firm

- Supply of firm

- Is MC where  $P >$  shutdown point since firm would not operate below shutdown point
- Shutdown point when  $P \leq AVC$  minimum

#### - Long run

- If economic profits then super-normal rate of return – therefore firms will enter the market → market P decreases → firm price decreases

- Profits serve a useful allocative function

- All firms earning less than before because more firms and lower market/firm price but overall greater output in the market

- Happens until profits = 0 (where  $P =$  minimum ATC a.k.a. capacity)

- No more incentive enter the market

- Then S stops shifting and no more changes in market/firm price

- Everyone breaks even so no incentive to leave or join

- Overall market is consumer-friendly, producer-hostile
  - o Consumer gets lowest possible price and quantity produced in highest possible
  - o Reason why lobbies representing workers are against liberalisation policies

# Monopolies

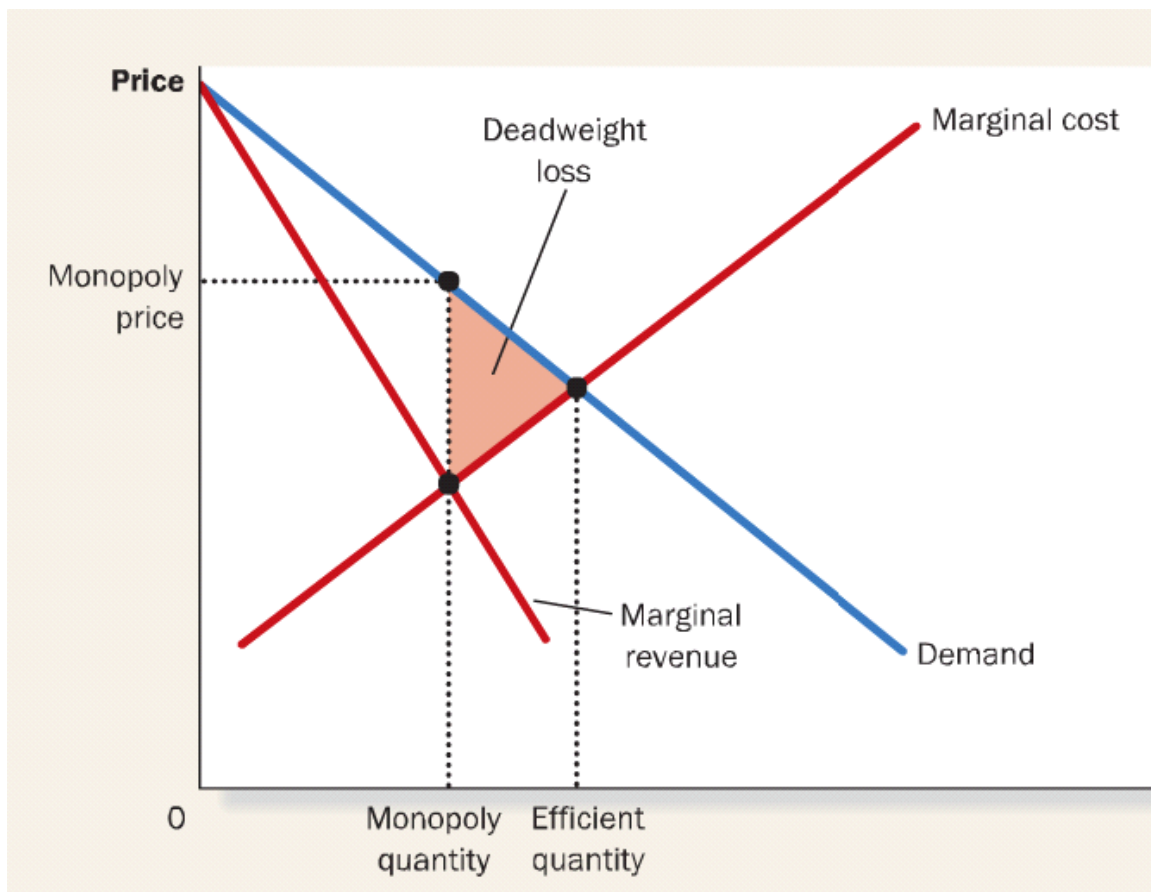
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- How they arise
  - o Own a key resource (exclusive ownership)
    - E.g. only one well in town and one person owns the well so they can charge whatever price they want and people will pay the price because it is an essential resource
  - o Government-created (patents, copyright laws)
    - E.g. drug patents for drugs developed help the producers keep charging high prices
      - Some drug monopolies keep large share of market even after patent runs out because of brand-name recognition and people are less trusting of generic drugs claiming it isn't a perfect substitute
    - E.g. regulated airlines in Canada in the 1970s but then got deregulated in the 1980s (i.e. free entry, free pricing, free output setting) so much more competition --> lower prices, higher (quantity/amount of) service, lower profits
  - o Natural monopolies
    - A single firm is enough to supply a good or service to an entire market at a smaller cost than two or more firms could (economies of scale over relevant range of output)
      - I.e. ATC is lowest if only 1 firm serves the market
    - E.g. water distribution - water pipes needs to be all over town; costs to install pipe system everywhere to compete with a water providing monopoly isn't worth
    - E.g. bridge in a small town - town population is small enough that another bridge isn't necessary (i.e. one is sufficient for whole town)
    - Natural monopolies less worried about entrants to market (usually profits made by monopoly --> entrants seeking profits = competition)
- Major attributes
  - o Only one firm selling therefore market is the firm and the firm is the market so single curve
    - Due to barriers to entry to the market
    - Monopolist is a price maker—has market power
      - Cannot choose the equilibrium price or quantity since still need to follow market demand curve
  - o No distinction between short and long run
  - o Economists and government don't like because undesirable economic outcomes
    - Markets shouldn't resemble monopolies
- Price making

- Market demand curve is firm's demand curve (because firm is only one operating in the market so firm=market)
- A firm with market power can raise its price without losing all of its sales
  - Implies demand curve of the monopolist is downward sloping, not perfectly elastic
  - Demand tends to be price inelastic since no other competitors/close substitutes
- Firm must operate on its demand curve but can operate anywhere on it so many different (but not infinite) choices
- Profit max is at quantity where  $MC = MR$ 
  - But price is found on the D curve using corresponding price for that  $Q_d$
- $P > MR$  for any level of output since D is always above MR and price will be along D
  - MR will intersect quantity axis at midpoint between origin and where D intersects quantity axis

- Welfare

- Socially efficient quantity is where MC and D intersect but always end up producing less than  $Q_{opt}$ 
  - Raising quantity would increase social surplus but not as high as it should be so social surplus is lower than max possible (therefore inefficient)
- Deadweight loss = triangle ABC formed where
  - A: where  $MC = MR$
  - B: P along D where  $MC = MR$
  - C: where  $D = MC$



- Some positives of a monopoly
  - Helps the firm compete internationally if they get large enough
  - Economies of scale
  - Monopolies might innovate more due to supernormal profits
- Price discrimination: different prices charged to different customers (according to willingness to pay)
  - Must be able to discriminate certain groups of customers otherwise arbitrage (people buying a good at a low price to sell to others who have to buy at higher prices) occurs
  - Perfect price discrimination: producer knows exactly willingness to pay of each customer and knows how much to charge each customer exactly
    - Not possible in real life
  - Imperfect price discrimination
    - Second-degree: charging different prices to same customer for different units that the customer buys (i.e. quantity discounts)
      - Works because customer's willingness to pay for the next unit usually declines as each unit is bought (i.e. more units bought = more willing to buy/pay)
    - Third-degree: when market can be segmented and each segment has different price elasticities of demand
      - E.g. different bus fares according to age
- Public policies against monopolies

- Increase competition with competition law - legislation to encourage competition and discourage use on monopoly practices
  - E.g. laws to prevent mergers which would cause a monopoly in the affected market
  - But sometimes prevent the benefit of "synergies" (benefit of cost efficiency and efficiency in general through joint production) of mergers which make Canadian companies unable to compete internationally
  - If these laws are to improve social welfare, governments need to determine which mergers are good/bad instead of blindly accepting/prohibiting
    - But some claim governments cannot accurately determine cost-benefit analysis
- Regulating behaviour of monopolies so that they cannot charge whatever they want and price is determined by government using various pricing systems
  - Marginal cost pricing (where  $P = MP$ )
    - Good - this would maximize total surplus and mean efficient resource allocation
    - Bad - natural monopolies have declining ATC and when ATC is declining, MC is lower than ATC so that P will be lower than ATC meaning that a loss is being made so that the firm would exit the industry
      - Government can subsidize the monopolist but that means raising money through taxes which causes deadweight losses
      - Regulator can let monopolist charge price higher than MC
        - ◆ If  $P = ATC$  ("average cost pricing") then 0 economic profits but now outcome is inefficient and causes deadweight losses in the market
    - Bad (applies to average cost pricing as well) - gives no incentive to monopolist to reduce costs
      - Since in competitive markets, lower cost --> higher profits but in this case monopolists will get same profits no matter how efficient production costs are
- Public ownership - rather than regulate a monopoly run by a private firm, government takes over and runs the firm itself ("Crown corporations")
  - E.g. Ontario Hydro, Canada Post, CBC, VIA Rail
  - Economists generally prefer private ownership since private owners have a better incentive to keep production costs efficient (inefficient then losses come out of their own pockets) as opposed to publically owned companies (losses come from taxpayers' money)
- Do nothing
  - All of the aforementioned strategies each have their own drawbacks so some economists argue that doing nothing and leaving monopolies alone is a better option