Microeconomics review notes

Comparative Advantage & the Basis for Trade

Definition:

Model: a simplified representation of reality.

生产可能性曲线 **Production Possibility Curve**: captures all maximum output possibilities for two (or more) goods, given a set of inputs (or resources - i.e.,time) if inputs are used efficiently.

高效生产点 **Efficient Production Point**: represents a combination of goods (bananas & rabbits) for which currently available resources (Alberto's time) do not allow an increase in the production of one good without a reduction in the production of the other. All the points on the PPC are efficient.

低效生产点 **Inefficient Production Point**: represents a combination of goods (bananas & rabbits) for which currently available resources (Alberto's time) allow an increase in the production of one good without a reduction in the production of the other. All the points below and to the left of the PPC are inefficient.

可达生产点 **Attainable Production Point**: represents any combination of goods (bananas & rabbits) that can be produced with the currently available resources (Alberto's time). All the points on the PPC or below and to the left of the PPC are attainable.

不可达生产点 **Unattainable Production Point**: represents any combination of goods (bananas & rabbits) thatcan not be produced with the currently available resources (Alberto's time). All the points that lie outside of the PPC are unattainable.

绝对优势 **Absolute Advantage**: An agent (or an economy) has an **Absolute Advantage** in a productive activity (like collecting bananas or catching rabbits) when he/she can carry on this activity with less resources (i.e., less time) than another agent.

机会成本 **Opportunity Cost**: The **Opportunity Cost** of a given action is the value of the next best alternative to that particular action.

比较优势 **Comparative Advantage**: An agent (or an economy)has an **Comparative Advantage** in a productive activity (like collecting bananas or catching rabbits) when he/she has a lower opportunity cost of carrying this activity than another agent.

比较优势原则 **Principle of Comparative Advantage**: Everyone is better off if each agent (or each country) specializes in the activities for which they have a comparative advantage. The gains from specialization grow larger as the difference in opportunity cost increases!

机会成本递增法则 **Principle of Increasing Opportunity Cost (Low Hanging Fruit)**: In the process of increasing the production of any good, firstemploy those resources with the lowest opportunity cost and only once these are exhausted turn to resources with higher cost.

消费可能性曲线 **Consumption Possibility Curve**: represents all possible combinations of two goods that the agents in an economy can consume(that the economy can feasibly consume when it is open to international trade).

OC = slope of the PPC !!!
$OC_{bananas}$ = loss in rabbit / gain in bananas
OC_{rabbit} = loss in bananas / gain in rabbit

The main factors driving economic growth (i.e., push the economy PPC out and to the right) are:
↑ in infrastructure → factories, equipment,
↑ in population → labour force,
Advancement ↑ in knowledge & technology → education, R&D, IT, communication tech.

Classic Critiques to the Model
We assumed
No psychological cost associated to performing the same activity the entire day → Boredom doesn't kill you!
No transaction cost connected with trading (i.e., negotiation costs, transportation costs, etc)
No import quotas or tariffs → would limit the gains from specialization by making specialization (beyond a certain level) pointless
No change in preference for goods/services in which a country specializes in and no accounting for social norms that might prevent trading

Perfectly Competitive Markets

Definition:
Market: The Market for a given good or service is the set of all the consumers and suppliers who are willing to buy and sell that good or service at a given price.
市场均衡 **Market Equilibrium**: occurs when the price and the quantity sold of a given good is stable. Or **market equilibrium** occurs when the equilibrium price is such that the quantity that consumers want today is the same as the quantity that suppliers want to sell.

完全市场竞争的特点 **Perfectly Competitive Market Characteristics**:
Consumers and Suppliers are Price-Takers
Homogeneous Goods 同类的
No Externality 外形
Goods are Excludable and Rival 排他性和竞争对手
Full Information
Free Entry and Exit

Supply in a Perfectly Competitive Market

Definition:

边际效益 **Marginal Benefit**: The **Marginal Benefit** of producing a certain unit of a given good is the extra benefit accrued by producing that unit.

边际成本 **Marginal Cost**: The **Marginal Cost** of producing a certain unit of a given good is the extra cost of producing that unit.

成本效益原则 **Cost-Benefit Principle**: states that an action should be taken if the marginal benefit is greater than the marginal cost.

经济剩余 **Economic Surplus**: The **Economic Surplus** of a certain action is the difference between the marginal benefit and the marginal cost of taking that action.

供给量 **Quantity Supplied**: by a supplier represents the quantity of a given good or service that maximizes the profit of the supplier.

供给曲线 **Supply Curve**: represents the relationship between the price of a good or service and the quantity supplied of that good or service.

供给法则 **Law of Supply**: The tendency for a producer to offer more of a certain good or service when the price of that good or service increases.

沉没成本 **Sunk Cost**: is a cost that once paid cannot be recovered.

生产要素 **Factor of Production is Fixed**: If a **Factor of Production is Fixed**, then its cost does not vary with the quantity produced.

固定成本 **Fixed Cost**: is a cost associated with a fixed factor of production.

生产要素可变 **Factor of Production is Variable**: If a **Factor of Production is Variable**, then its cost trends to vary with the quantity produced.

可变成本 **Variable Cost**: is a cost associated with a variable factor of production.

短期 **Short Run**: is a period of time during which at least of one factor of production is fixed.

长期 **Long Run**: is a period of time during which all factors of production are variable.

利润 **Profit**: represents the difference between the total revenues (TR) and the total costs (TC).

关闭状态（短期） **Shut Down Condition (Short Run)**: In the short run, the entrepreneur should shut down production if $\pi_{production} <$ FC.
Otherwise, she should hire the optimal number of workers and continue operations.

关闭状态（长期） **Shut Down Condition (Long Run)**: In the long run, the entrepreneur should exit the industry if $\pi_{production} < 0$.
Otherwise, she should hire the optimal numberof workers and continue operations.

供给价格弹性 **Price Elasticity of Supply**: represents the percentage change in the quantity supplied resulting from a very small percentage change in price. It also measures the responsiveness of the supply to changes in price.

供给法则 **Law of Supply**: Supply curves have the tendency of being upward sloping.

供给弹性 **Elastic Supply**: Supply is elastic when the price elasticity of supply is greater than 1.

单位供给弹性 **Unit Elastic Supply**: Supply is unit elastic when the price elasticity of supply is equal to 1.

缺乏弹性的供给 **Inelastic Supply**: Supply is inelastic when the price elasticity of supply is less than 1.

Supply curve can be interpreted

Horizontally: Start from a certain Price and then use the supply curve to derive the Quantity of goods that will be supplied at that price.

Vertically: Start from a given Quantity, find the associated Price on the supply curve → the minimum amount of money the producer is willing to accept to supply the marginal unit of the good = Producer Reservation Price

From a Discrete to a Continuous Model

What would happen if the labour supply were much more flexible

→ employees were hired for as many hours (or even min/sec!) the entrepreneur wants?

Shut down:

→Short run: Price below min(AVC)

→Long run: Price below min(ATC)

Supply Curve =

The part of the MC Curve above the AVC (→Short run)

The part of the MC Curve above the ATC (→Long run)

ΔP→Δ→ move along the supply curve

Δfactor of production that affects MC→ shift of the supply curve

What shifts the supply curve to the right:

Drop in the price of (variable) inputs

Advancement in technology (via its impact on productivity)

Expectations (on future prices/demand ↑)

Drop in the prices/demand of other products

↑ in number of suppliers

$\text{Elasticity}_A = (1/\text{slope}) \times (P_A/Q_A)$

$\text{Elasticity}_A = (\Delta Q/Q_A) / (\Delta P/P_A)$ >0 !!!

What changes the elasticity of supply:

Availability of raw materials

Factors mobility

Inventories / Excess capacity

Time horizon

Demand in Perfectly Competitive Market

Definition:

Utility: represents the satisfaction that an individual derives from consuming a given good or taking a certain action. It is measured in utils per unit of time.

边际效用递减 **Decreasing Marginal Utility**: captures the fact that the utility from consuming an extra unit of a given good decreases with the number of units that have been previously consumed.

Cost-Benefit Principle: states that an action should be taken if the marginal benefit is greater than the marginal cost.

需求量 **Quantity Demanded**: by a consumer represents the quantity of a given good or service that maximizes the utility experienced by the individual consuming it.

Demand Curve: represents the relationship between the price of a good or service and the quantity demanded of that good or service.

Law of Demand: the tendency for a consumer to demand more of a certain good or service when the price of that good or service decreases.

替代效应 **Substitution Effect**: captures the change in the quantity demanded of a given good following a change in its relative price.

↓ price → Substitution Effect ↑ quantity consumed

↑ price → Substitution Effect ↓ quantity consumed

收入效应 **Income Effect**: captures the changes inthe quantity demanded of a given good following the reduction inthe consumer's purchasing power.

For a normal good,

↓ in income → ↓ quantity consumed

↑ in income → ↑ quantity consumed

For an inferior good,

↓ in income → ↑ quantity consumed

↑ in income → ↓ quantity consumed

Substitution Effect + Income Effect:

Usually the Substitution Effect dominates so

↑ Price → ↓ overall quantity consumed

↓ Price → ↑ overall quantity consumed

For a Giffen good (very rare),

↑ price → ↑ overall quantity consumed

Substitutes: Two goods are **Substitutes** when an ↑ in the price of one causes ↑ an in the quantity demanded of the other.

Complements: Two good are **Complements** when a ↓ in the price of one causes an ↑ in the quantity demanded of the other.

Price Elasticity of Demand: represents the percentage change in the quantity demanded resulting from a very small percentage change in price. It also measures the responsiveness of the demand to changes in price.

Law of Demand: Demand curve have the tendency of being downward sloping.

Elastic Demand: Demand is elastic when the price elasticity of demand is greater than 1.

Unit Elastic Demand: Demand is unit elastic when the price elasticity of demand is equal to 1.

Inelastic Demand: Demand is inelastic when the price elasticity of demand is less than 1.

Why did the demand for soda ↓ when price ↑ ?
Other goods became cheaper (relative to the price of soda) than before and so Isa decided to consume more of them → substitution effect
An increase in the price soda makes Isa poorer in terms of her purchasing power → income effect

Demand curve can be interpreted
Horizontally: Start from a certain Price and then use the demand curve to derive the Quantity of goods that the consumer is willing to buy at that price.
Vertically: Start from a given Quantity, find the associated Price on the demand curve → the maximum amount of money the consume is willing to pay for the marginal unit of the good, also called Consumer Reservation Price (or Willingness to Pay)

From a Discrete to a Continuous Model
Demand Curve = MB curve (for consumer)
ΔP → ??ΔQ → move along the demand curve
Δpreference (mkting, price of other goods) → shift of the demand curve
What shifts the demand curve to the right:
Successful marketing campaign
Decrease in the price of complements
An increase in the price of substitutes
An increase in income for a normal good
A decrease in income for an inferior good
A positive shift in consumers' preference for a good
Expectations (about ↑ in future prices that push the buyers to try to purchase the goods early)
Population growth

$Elasticity_A = (1/slope) \times (P_A/Q_A)$
$Elasticity_A = (\Delta Q/Q_A) / (\Delta P/P_A)$ < 0 !!!

What changes the elasticity of demand:
Availability of substitutes
Definition of goods
Income share
Time horizon

Demand & Supply An Equilibrium Analysis

Definition:
总需求 **Aggregate Demand (or Supply)**: represents the horizontal sum of the individual Demand (or Supply) curves.

供给过剩 **Excess Supply**: depicts a situation where the quantity supplied is larger than the quantity demanded.

超额需求 **Excess Demand**: depicts a situation where the quantity demanded is larger than the quantity supplied.

均衡价格 **Equilibrium Price (Quantity)**: represents the price (quantity) such that the quantity supplied equals the quantity demanded.

买方保留价格 **Reservation Price of a Buyer**: is the highest price a buyer is willing to pay for a given good.

卖方保留价格 **Reservation Price of a Seller**: is the lowest price a seller is willing to accept for a given good.

配给原则 **Rationing Rule**: states that buyers who value the good more will be the first to buy it.

消费者剩余 **Consumer Surplus**: represents the difference between what a consumer pays for a good or service and what she is willing to pay for that good or service (her reservation price).

生产者剩余 **Producer Surplus**: represents the difference between the price a seller receives for a good or service and what she is willing to receive for that good or service (her reservation price).

消费者总剩余 **Total Consumer Surplus**: represents the sum of the economic surplus of all consumers.

生产者总剩余 **Total Producer Surplus**: represents the sum of the economic surplus of all producers.

总剩余 **Total Surplus**: is the sum of the total consumer surplus and total producer surplus.

帕累托效率 **Pareto Efficiency** (Short Run): is a situation in which it is impossible to make any individual better off without making at least one other individual worse off.

帕累托提高交易 **Pareto Improving Transaction**: is a transaction where all parties involved are better off.

看不见的手原则 **The Invisible Hand Principle**: states that individuals' independent efforts to maximize their gains (profits for seller; utility for buyers) will generally be beneficial for society and result in the socially optimal allocation of resources.

The Invisible Hand (Long Run):

In the long run, firms produce at lowest possible ATC!

Existing firms can adjust all their factors of production (and perhaps exit) → it's the long run!

New firms can enter the market (as long as $\pi_{production} > 0$)

→ S curve shifts to right → P* ↓

→ Production ↓ until $\pi_{production} = 0$

→ Firms produce Q* such that ATC is minimized

$P^*_{LR} = \min(ATC)$!!!

→ What if initially $\pi_{production} < 0$?

All firms

- produce with the same technology (→ same cost curves)
- sell at $p^* = \min(ATC)$

Government Intervention The Cost of Interfering with Market Force

Definition:

价格上限 **Price Ceiling**: represents a maximum allowable price imposed by the government.
(when Gov. Believes that P is unfairly high to protect low-income consumers)

无谓损失 **Deadweight Loss**: is the loss in economic surplus due to the market being prevented from reaching the equilibrium price and quantity where marginal benefit (MB) equals marginal cost (MC).

价格下限 **Price Floor**: represents a minimum allowable price imposed by the government.
(when Gov. Believes that P is unfairly low to protect producers in a certain sector)

Price Ceiling:

The 'winner' of this policy are the consumers with high reservation price (i.e., high willingness to pay) → the rich!!

Solution: If the government wanted to help the low-income householders, a direct lump sum transfer to the poor is more efficient.

Price Floor:

The 'loser' of this policy are all those harmed by the price floor → consumers & producers!!

Solution: The 'loser' would be willing to pay 'winners' the exact amount they gained from the intervention in exchange for cancelling the price floor Pareto Improving Transaction!

Taxation:

→ Unlike the price ceiling and the price floor, a tax generates tax revenues

→ Tax revenues can be used to redistribute wealth within a society

(improves the distribution of Income & Opportunities across different population groups)

The 'loser' of this policy are

- the consumers & producers (P ↓, Q ↑) or
- the consumers (if D = inelastic OR S = perfectly elastic)
- the producers (if S = inelastic OR D = perfectly elastic)

The 'winner' is the Government → gets tax revenue

Solution: The 'loser' would be willing to pay the 'winner' the exact amount it gained from the intervention in exchange for cancelling the tax → Pareto Improving Transaction!

The 'winner' is Gov. → use tax revenue to

- subsidize or reduce taxes on other markets
- provide **public goods**, etc.

What is the most efficient way of collecting tax revenues?
Tax those with the lowest elasticity!!
Why? The more elastic supply & demand are at the initial P*, the bigger the deadweight loss!
If Gov. Needs to impose a $1 tax, the most effective way of doing it is to apply it to the least "elastic" market!

津贴 **Subsidy**:
→ Opposite of a tax
→ Government Cost to assist certain groups of consumers (or producers)
(makes certain goods more affordable for certain groups of consumers)
The 'winner' of this policy are the consumers and producers, but it cost more to the Government then it benefits the people.
Solution: If the government wanted to make certain goods more affordable, a direct lump sum transfer to the poor is more efficient.

Summary: Government Intervention
Perfectly competitive markets converge to an equilibrium where total surplus is maximized
→ Any Gov. Intervention that prevents a market
From reaching its P* is bad for total surplus
→ AVOID Gov. Intervention at all cost!
Sometimes this is not true: Public Goods!

International Trade

Definition:

国内价格 **Domestic Price**: represents the equilibrium price that would occur in a country if no international trade is allowed.

世界价格 **World Price**: represents the equilibrium price on the international market.

小型开放经济 **Small Open Economy**: is an economy that participates in international markets, but its production (or consumption) is small enough compared to the rest of the world that its supply (or demand) does not affect the world price.

封闭经济 **Closed Economy**: is an economy that does not engage in international trade. Also known as **autarky**.

从贸易中获益 **Gains from Trade**: capture the extra surplus available in an open economy compared to a closed economy.

进口关税 **Import Tariff**: represents a tax on imported goods or services.

进口配额 **Import Quota**: represents a quantity limit on the amount of goods or services permitted to be imported.

Meet a small economy

→ Has a certain P_d = (domestic price), and

→ takes P_w (world price) as given

→ no seller will accept less than P_w as he can always sell overseas at P_w

→ no buyer will pay more than P_w as she can always buy from overseas at P_w

Exporting

If $P_d < P_w$ → Exporter !!!

Why we generally want countries to open up to trade?

Gains from Trade!

The **Gains from Trade** come from international consumers (at the expense of domestic consumers surplus) !

Importing

If $P_d > P_w$ → Importer !!!

Why we generally want countries to open up to trade?

Gains from Trade!

The **Gains from Trade** come from larger surplus for domestic consumers (who now buy at low prices) !

Additional Benefits from Trade

Consumers have access to a wider variety of goods (Italian soft drinks, Indian movies),

Producers may be able to take advantage of economies of scale by selling to a larger market (bauxite, copper),

Domestic monopolies or oligopolies might face international competition, reducing their market power (bookstores),

Flow of ideas and technology is faster and easier.

Trade Restrictions: Tariffs

Domestic consumer lose BUT domestic producers/government gain

→ is a tariff good or bad?

Deadweight Loss → Tariff is bad!

Trade Restrictions: Quotas

Domestic consumer lose BUT domestic producers gain

→ is a quota good or bad?

Deadweight Loss → Quota is bad!

Imperfectly Competitive Markets

Im-perfect = Perfect except that one or more of the following assumptions apply:
Consumers/suppliers are NOT price-takers, or
Goods are NOT homogeneous, or
There ARE externalities, or
Goods are NOT excludable and rival, or
Imperfect (not full) information, or
NO free entry and exit.

Definition:
Price-Maker (or **Price-Setter**): A firm is said to be a **Price-Maker** (or **Price-Setter**) if it has the ability to set its own prices.
Market Power: A firm has **Market Power** if it has the ability to set its own price.
Increasing Returns to Scale (IRS): We say that there are **Increasing Returns to Scale (Economies of Scale)** when the average cost of producing a certain good decreases with the amount of the good produced.
Natural Monopoly: denotes a monopoly that occurs because of increasing returns to scale.

Types of Market Power
Monopoly: Only one firm in the market (→ the firm's individual D curve = market D!)
Monopolistic Competition: There is a large number of firms, each producing slightly differentiated goods (almost perfect substitutes).
Oligopolistic Competition: There is a small number of firms selling goods that are close substitutes.

Antidote to Market Power
Free Entry / Exit!
Otherwise, barriers to entry:
Control Over Scarce Resources
Government-Created Barriers to Entry (patents, copyrights, licenses, etc)
Increasing Returns to Scale
Network Economies

Increasing Returns to Scale (IRS)
→ Firms experiencing IRS become more profitable with size
→ A single firm producing a large quantity of the good can do so more efficiently than a large number of firms each producing small quantities.

Natural Monopoly!

Market Power Monopoly

Definition:

Monopoly: is a market structure where there is only one firm operating in the market.

Competition Law: denotes a law that is intended to foster market competition by regulating the anti-competitive conduct of firms. (ensures that consumers are charged the lowest possible prices)

Average Cost Pricing (esp. For natural monopolies): denotes a policy through which the government forces the monopolist to set the price and quantity at the intersection of the ATC curve and demand curve. (eliminates any positive profit accrued to the monopolist)

Allocatively Inefficient: A firm's output is said to be **Allocatively Inefficient** if the price asked for the goods produced exceeds their marginal cost.

First Degree Price Discrimination: describes a situation in which the monopolist knows the reservation price of each consumer and is able to charge each consumer his marginal benefit (or reservation price).

Number of units that maximizes monopolist's profit? MR = MC

Monopoly and the Invisible Hand

Why is there a conflict between what the monopolist wants and what consumers desire?

To sell the extra units of the good and attract new consumers, the monopolist needs to ↓ P

→ affects all units sold (because the monopolist needs to charge all consumers the same price)

→ implicit cost in ↑ Q sold →

$Q^*_{monopoly} < Q^*_{socially}$

Government Regulation

The Average Cost Pricing is hard to implement:

- government does not know the ATC (it can only estimate them)
- once implemented, firms have no incentive to invest in new technology to lower their costs
- when implemented, the firm's output is allocatively inefficient.

Solution: Set Price Ceiling at MC

→ But in same case $\pi < 0$, the industry collapses!

First Degree Price Discrimination

What if the monopolist could set a different price for different consumers?

Assume that the monopolist

- knows the maximum price (or reservation price) that every consumer is willing to Pay AND
- can charge each consumer exactly his reservation price.

A monopolist engaging in 1st degree price discrimination is actually selling the socially optimal quantity (that max. social surplus)!

BUT uneven distribution of surplus in society:

The monopolist extracts all surplus from the consumers (i.e., it accrued all the surplus available in the market).

Other Forms of Price Discrimination

- Second degree price discrimination: the monopolist charges different prices depending on the quantity/quality demanded by each consumer (bulk discount, economy/business airfare, etc).
- Third degree price discrimination: the monopolist charges different prices depending on observable consumers' attributes such as location (European vs. Australia as 2 # mkts)

Market Power Oligopoly

Definition:

Oligopoly: is a market structure that features a small number of firms.

Dominant Strategy: represents a strategy that is preferred by a player irrespective of the strategy selected by the other player.

Simultaneous Game: is a type of game in which players move simultaneously or, alternatively, they are unaware of the other players' actions.

Cartels: represents private agreements aimed at increasing the profit of the cartel members by reducing competition in the market. (by controlling prices or preventing entry)

Coordination Games: are a type of games that capture those situations where the players benefit from coordinating their decisions.

Battle of the Sexes: is a game in which players differ over which activity they would prefer to engage in, but they still prefer engaging in the same activity over going alone.

Strategy Profile: denotes a set of strategies one for each player.

Market Power: Oligopoly

Small number of firms → strategic interactions:

The actions of one firm has direct effects on the other firms (and vice-versa)

→ in making its own decision, a firm tries to anticipate what the other firms are about to do!

Game Theory

Prisoner's Dilemma Game

The individual quest for profit does not lead to socially optimal allocation of resources

Adam Smith's Invisible Hand Principle fails!

Cartel Game

Cartels are illegal nearly everywhere (prohibited under competition law)

→ cartel members cannot write enforceable contracts to keep the other members in line

prisoner's dilemma

Coordination Games: Battle of the Sexes

	Theatre	Stadium
Theatre	20,10	0,0
Stadium	0,0	2,15

Both strategy profiles are possible outcomes of the game

→ A/B do no benefit by unilaterally changing their strategies

→ Both strategy profiles are Nash equilibria of the game!

Externalities

Definition:

Positive Consumption Externality: represents a benefit accrued to someone who is not involved in the consumption of a given good.

Coase theorem: "If trade in an externality is possible and there are no transaction costs, bargaining will lead to an efficient outcome regardless of the initial allocation of property rights."

Negative Production Externality: represents a cost incurred by someone who is not involved in the production of a given good.

Negative Consumption Externality: represents a cost incurred by someone who is not involved in the consumption of a given good.

Positive Production Externality: represents a benefit accrued to someone who is not involved in the production of a given good.

Positive Consumption Externality

Making consumption decisions without accounting for their external benefit doesn't allow to max social surplus!

→ Deadweight Loss!!

→ Private optimal consumption = 4 units

→ Social optimal consumption = 6 units

Invisible Hand Principle fails!!

Solution: private negotiation

Some examples:

Fitness activities

Vaccinations

Bike to work

Education

Social networking

Fire protection services

Negative Production Externality

Making consumption decisions without accounting for their external costs doesn't allow to max social surplus!

→ Deadweight Loss!!

→ Private optimal consumption = 3 units

→ Social optimal consumption = 2 units

Invisible Hand Principle fails!!

Solution: private negotiation

Some examples:

Harmful production activities (global warming)

Excessive risk-taking

Over-fishing

Externalities in Large Markets

Many buyers & sellers → smooth private D & private S curves

→ add externalities → smooth social D & social S curves

Coase conditions do not apply anymore!!!

Coase conditions do not apply anymore (high transaction costs)

→ Government must intervene (subsidy or tax)!

Negative Consumption Externality

Some examples:

Smoking

Alcohol abuse

Driving

Positive Production Externality
Some examples:
Beneficial production activities
New production technologies
On-the-job training

Public Goods

Definition:
Non-Rivalry: One individual's consumption of the good does not impede another individual from consuming it as well: the MC of the providing the public good to an additional individual is zero.
Non-Excludability: No one can be excluded from consuming the good.
Pure Public Goods: represent goods that are perfectly non-rivalrous & non-excludable.
Impure Public Goods: represent goods that are non-rivalrous & non-excludable only up to a point.
Marginal Social Benefit (MSB): is the vertical sum of the individual marginal benefits.
Samuelson Condition: states that the efficient quantity of a public good is found by setting the sum of the individual marginal benefits equal to the marginal cost.
Free-Riding: denotes the action of enjoying a good without paying for it → is caused by the non-excludable nature of public goods and it results in their under-provision.
Lindahl Prices: imply that each individual pays for the provision of a public good according to their marginal benefit.

Some examples:
Education
Health system
National defense
Judiciary system

Pure vs. Impure Public Goods

- Excludable, but non-rivalrous
  - Pay TV (needs subscription, but your enjoyment is not affected by someone else watching TV)
  - Busses, airplanes, etc
    - for access: you must pay a P although MC = 0
- Non-excludable, but rivalrous
  - Congested motorway (no toll, but takes longer time)
  - Hospitals, schools, public transport, this Micro 1 course
    - before full capacity is reached: MC = 0 → PURE
    - after full capacity is reached: MC > 0 → IMPURE

Efficiency

Say Price = $30/h → What is the efficient number of hours Anna & Zoe should hire the cleaner for?

∑ Marginal Ind. Benefits = Marginal Social Benefits = MC = Price

Samuelson Condition

Market Provision and Free-Riding

Do markets provide goods efficiently?

- YES! → for private goods
- NO! → for public goods → WHY?

Left to their own devices, will Anna and Zoe hire the cleaner for the efficient number of hours?

Why shouldn't Anna and Zoe AGREE on 6 hours per week at $30 per hour (the efficient # of hours)?

Anna and Zoe could SHARE the MC:

- Anna could pay her marginal benefit → $20 per hour
- Zoe could pay her marginal benefit → $10 per hour

$30 per hour

Lindahl Price

Won't work

Public Goods and Externalities

A public good is an extreme case of positive externality!

- Like positive externalities (remember perfume!) → non-excludable (everyone can enjoy Maia's perfume) AND under-provided by the market
- Extreme case because unlike standard externalities → the benefit accrued to those who enjoy the public good does not depend on who is providing it (could be either Zoe or Anna) → another way of defining non-rivalry

Market, Government & Taxation

- Non-rivalry → each individual can benefit from someone else's public good provision
- Non-excludability → an individual cannot be stopped from enjoying it.

Government Intervention

Solution: Tax To Provide Public Goods

How? Government hires the cleaner for 6 hours and tax Anna & Zoe $20 and $10 per hour (their Lindahl Price)

BUT NOT PERFECT!

MB_{Anna} & MB_{Zoe} are NOT common knowledge! → THEY have an incentive to understate their true valuations, hoping to free-ride on the other's provision.

As individual demands are private info, the Government must follow 2 fairness principles:

→ tax according to ability to pay

→ tax according to pay-as-you-go principle