

ECONOMICS (SL)

PAPER 1 (ESSAY) REVISION

NOTES

UNIT 1: MICROECONOMICS

UNIT 2: MACROECONOMICS

“Brevity is the soul of wit”

----- William Shakespeare, Hamlet

Unfortunately, brevity is not possible in Economics...

However, my best efforts have been made to make this set of notes as helpful, concise & yet detailed as possible.

Enjoy.

As for Paper 2 notes... hehe

Make them yourself, ain't got anytime for that.



MICROECONOMICS

Contents

Topic	Content outline
0: Foundation of Economics	Basic Concepts Factors of Production PPC Economic Efficiency Economic Systems Definition List
1.1 Supply and Demand	Markets Demand Supply Market Equilibrium Interrelationships between markets Producer and Consumer surplus Definition List
1.2 Elasticities	PED XED YED PES Applications of PED, XED, YED Definition List
1.3 Price Controls	Taxation Subsidies Price Ceiling Price Floor (Extension: Minimum Wage) Definition List
1.4 Market Failure	Introduction to Market Failure Efficiency: Market, social Externalities (EB/EC) Negative/Positive externalities of production Negative/Positive externalities of consumption Types of goods (merit, demerit, private, public) Missing Markets for public goods Common Access Resources Threat to sustainable development Definition List

MACROECONOMICS

Topic	Content outline
2.1 Level of overall economic activity	Circular income flow model Measures of economic activity Uses of national income statistics Problems with using NI statistics as indicators of living standards Alternative measures of living standards Business cycle
2.2 AD & AS	Aggregate Demand Aggregate Supply Inflationary & Deflationary Gaps
2.3.1 Macroeconomic objective 1: Low unemployment rate	Introduction to unemployment and definitions Measures of unemployment Costs of unemployment Types & causes of unemployment Diagrams illustrating unemployment Policies to reduce unemployment
2.3.2 Macroeconomic objective 2: Low and stable inflation	Introduction to inflation Measures of inflation Types and causes of inflation Consequences of inflation & deflation Policies to reduce a high rate of inflation
2.3.3 Macroeconomic objective 3: Economic Growth	Types of economic growth Causes of economic growth Consequences of economic growth
2.3.4 Macroeconomic objective 4: Equity in income distribution	Meaning of equity and inequity Causes of income inequality Indicators of income inequality Poverty Policies to promote equity
2.4.1 Demand side policies (fiscal policy)	Introduction Government budget Role of fiscal policy Evaluation of fiscal policy
2.4.2 Demand side policies (Monetary policy)	Introduction Central banks & interest rates Role of monetary policy Evaluation of monetary policy
2.5 Supply side policies	Introduction Types of supply side policies Evaluation of supply side policies BONUS: Comparison of demand side and supply side policies



Basic Concepts

- Scarcity: Unlimited wants, Limited resources
- Necessitates choice → Opportunity cost (Aim in Economics: Reduce this opportunity cost)
- Need for the efficient allocation of resources (Different economic systems)

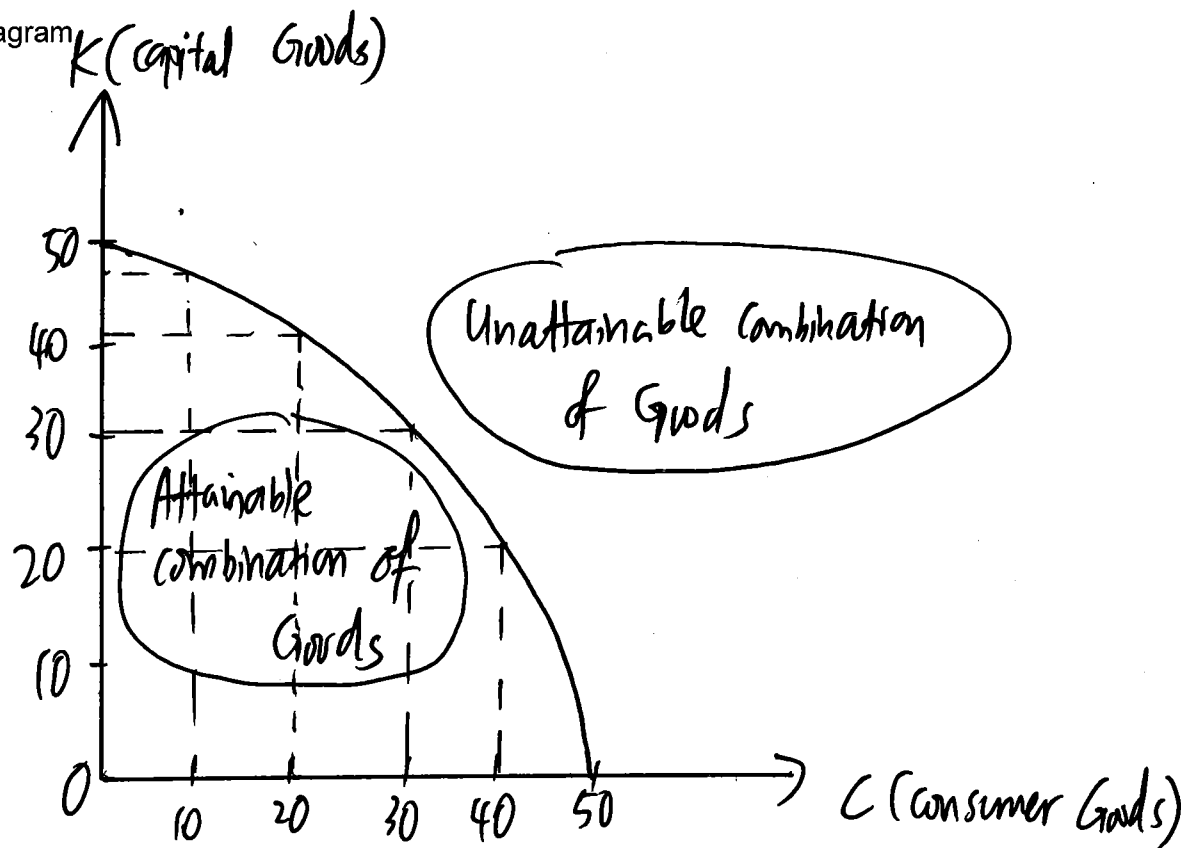
Resources: Factors of production

1. Land
2. Labour
3. Capital
 - Resources that are used to produce other goods (eg. machinery)
 - (a) Fixed Capital: Durable/ used repeatedly (eg machinery)
 - (b) Circulating Capital: used once in production process (eg coal)
4. Enterprise (Risk takers, innovators → lead to new goods and services)

Production Possibilities Curve (Applied in Macroeconomics)

- Shows productive capacity of a country
- Assumptions: constant state of technology, fixed time period, fixed quantity and quality of resources, all resources efficiently employed (Y_{fe} : Macroeconomics link)

PPC Diagram



Law of increasing opportunity cost

- To produce more consumer goods, increasing amounts of capital goods must be forgone

Reason:

- As more consumer goods are produced, more resources to produce consumer goods are required
- As there may be insufficient consumer good resources to produce consumer goods, resources to produce capital goods are diverted to produce consumer goods
- As resources to produce capital goods are less substitutable, **more capital good resources are required to produce a single unit of consumer goods than consumer good resources**

Outward Shift in the PPC: Economic growth (Increase in Y_{fe})

- Increase in Quantity and quality of resources
- Increase in investment (More capital goods → More consumer goods in future)
- Advancement in state of technology

Economic Growth

- Actual Growth: Increase in Real GDP
- Potential Growth: Increase in country's productive capacity (more resources, advancements in technology)
Capable to produce more, but may not take advantage of the potential

Types of economic efficiency

1. Productive efficiency

- Economy producing at maximum output, minimum unit cost
- All resources **MUST** be fully employed (producing on the PPC)

2. Allocative efficiency

- Producing the desired output
- Economy producing on the PPC *and* at only ONE point on the PPC (specific combination of goods that maximises satisfaction and welfare)

Allocative efficiency ⇒ Productive efficiency

Productive efficiency ≠ Allocative efficiency

Economic Systems

Economic systems seek to answer the 3 basic economic questions

- **Free market/mixed/centrally planned economy**
 1. What and how much to produce?
 2. How to produce?
 3. For whom to produce

(i) **Free market economy**

- **Price mechanism** allocates resources
- Private ownership of resources, decision on how to allocate resources made by private sectors
- No government intervention (eg. taxes, subsidies, price controls)

Price Mechanism

- Works through the interaction of prices of factor and product markets and profit motive of producer
- Allocates resources in free market, removing surpluses and shortages
- **Signalling, Incentive and Rationing** functions

Addressing the 3 economic questions

1. What and how much to produce?

- Price **signals** producers on how much to produce

eg. Product market: Demand increases → Shortage → Price increases → Signals producers to increase Quantity supplied

- Product and factor markets interdependent (To increase production of goods, more resources are required)

Eg. Factor market: Firms increase quantity supply of goods → Increase in demand for factor (labour) → Increased wage rates → Signals workers to be employed

2. How to produce?

- Price has an **incentive** function
- Firms will choose the method of production that has the **lowest production costs, maximising profits** (eg. labour intensive, capital intensive)

3. For whom to produce

- Price also has a **rationing** function
- Price distributes goods to people according to their purchasing power (Ferrari vs Honda)

Advantages of the free market economy

1. Motivation for hard work (No taxes on income)
2. Absence of surplus & shortages (Allocative efficiency)
 - $MB=MC$
 - Market forces of supply and demand determine price
3. Consumers enjoy lower prices due to competition
4. Large choice of goods (with minimal government intervention)
5. Producers respond to consumer demand by price as a signal
6. Individuals free to make own economic decisions with minimal restrictions
 - Free to choose what to buy and what to work as
 - Free to set up firms to produce goods (entrepreneurship)---**factor of production (enterprise)**

Disadvantages: Income inequality

(ii) Command Economy/Centrally planned economy

- Government owns all resources (except labour)

Addressing the 3 economic questions

1. What and how much to produce?

- Government decides on combination of goods and services and estimates wants
- Government directs resources to industries to produce goods
- **No price mechanism**

2. How to produce?

- Government decides on method of production

3. For whom to produce?

- Government decides on income distribution (eg. communist state)
- Government distributes goods and services to people directly

Disadvantages: Command economy

- Lack of entrepreneurship (state controls all factors of production)

(iii) Mixed economy

- Consists of both private and public (gvt) sectors
- Resources owned by both private sector and government
- Decisions about resource allocation made by both private and public sectors

Definition list

1	Scarcity	Limited resources, unlimited wants
2	Resources/ factors of production	Land, Labour, Capital, Enterprise
3	Opportunity cost	Cost of using resources for a certain purpose and forgoing the next best use of the resources
4.	Actual Economic growth	Increase in Real GDP
5	Potential economic growth	Increase in productive capacity of a country
6	Productive efficiency	Economy producing at maximum output with minimum unit cost
7	Allocative efficiency	Using resources to produce the desired (most preferred combination and quantity of goods by consumers) output of goods and services
8	Free Market Economy	Price mechanism allocates resources All resources are owned by the private sector except defence Minimal Government intervention
9	Mixed economy	Resource allocation by both government and price mechanism Some resources owned by private sector, some owned by government
10	Centrally planned/Command economy	Government decides on allocation of resources Government owns all factors of production besides labour
11	Price mechanism	Works through the interaction of prices of factor and product markets as well the profit motive of producers. Allocates resources in a free market, removes surpluses and shortages. Has the function of signalling to producers on what and how much to produce through price, giving producers the incentive to produce goods with the least cost, and rationing output of goods and services according to the purchasing power of consumers



Section 1: Microeconomics

Topic 1: Competitive Markets (Supply and Demand)

(a) **Markets** = Buyers (consumers) + Sellers (producers) + Goods/services + Price

Consumers: Maximise satisfaction/utility

Producers: Maximise profits

Labour market: Resources are sold

Product market: Goods & Services are sold

(b) Demand

(i) Concepts of demand

Demand: **Willingness and ability** of consumers to buy various quantities of goods and at various prices in a certain time period

Law of Demand: Negative relationship between price of good and quantity demanded of a good (**Law of diminishing marginal utility**), *ceteris paribus**

***Ceteris Paribus**: Other non-price factors constant (no changes in taste, prices of substitutes same, income constant, no change in population, etc)

(ii) Determinants of demand

- Price Factors: Cause a change in **Quantity Demand & shifts along the demand curve**
- Non Price Factors: Cause a change in **Demand & entire demand curve shifts**

Price Factors

1. Changes in Price
 - Price↑, **Income effect** (same income can buy less units of same good), purchasing power ↓
 - Price↑, **substitution effect** (Consumers switch to cheaper substitute goods), causing Qd of good to decrease

Non Price Factors

1. **Changes in income**
2. **Changes in price of related goods**
 - Substitutes (eg. Price of Beef↑, Qd of Beef↓, Demand for Chicken↑)
 - Complements (Price of washing machines↑, Qd for washing machines↓, Demand for washing powder↓)
3. **Changes in taste** that make the good more/less favourable
 - Awareness of high cholesterol reduces demand for food high in cholesterol
4. **Changes in population**
5. **Changes in weather/ season**
 - Eg. different demand for different types of clothes in different seasons (winter/summer)
 - Heaters during winter
6. **Government legislation**
 - Necessary to purchase certain goods (eg. child seats for infants)

7. Changes in consumer expectations

- Expect prices in future to rise, buy more goods now (Demand ↑)

(c) Supply

(i) Concepts of supply

- **Supply: Willingness & Ability of producers to sell various quantities of goods at various prices in a certain time period**
- **Law of supply:** Positive relationship between price and quantity supply of good (Profit motive of producers), *ceteris paribus*

(ii) Determinants of supply

Price Factors (Shifts along supply curve)

1. Changes in price

- Price ↑, Profits increase, firms produce more goods (profit motivated)

Non Price Factors (entire supply curve shifts)

1. Changes in cost of production

- Changes in factor costs (Land, Labour, Capital, Enterprise)
- Taxation (increases production costs), subsidies (increases production costs)
- Production costs ↑, profits ↓, Supply ↓

2. Changes in state of technology (Increased efficiency in production)

3. Changes in number of suppliers

4. Abnormal conditions

- Natural Disasters (Roads/powerlines destroyed, goods cannot be delivered, etc)
- Supply shocks (Droughts reducing crop yield)

5. Change in prices of related goods

- Goods in **Competitive supply** (Price of maize ↑, Qs of maize ↑, Supply of corn ↓)
- Goods in **joint supply** (Price of Beef ↑, Qs of beef ↑, Supply of leather ↑)

6. Changes in producer expectations (Same as buyer expectations)

7. Changes in Quantity & Quality of resources

8. Changes in government policy

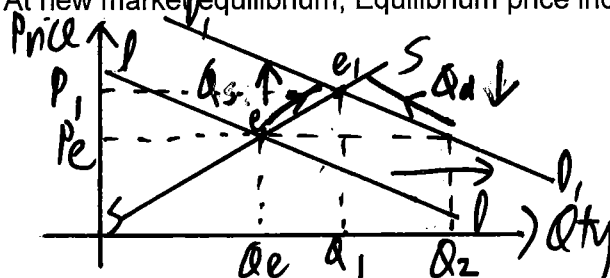
- Indirect Taxes (Specific, ad valorem): Reduces supply
- Subsidies: Reduce cost of production, increasing profits, increasing supply

(d) Market Equilibrium

Equilibrium Price: Quantity demanded = Quantity supplied

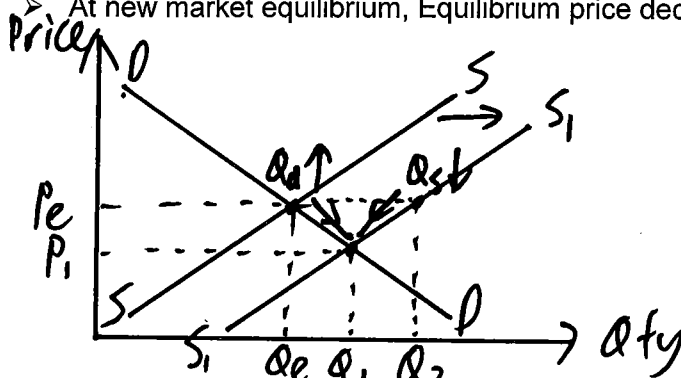
(i) Changes in Demand

- Demand ↑ (D to D₁) due to rise in income
- Excess demand (shortage): Q_e < Q₂
- Prices ↑
- In response to price ↑, Q_d decreases on the new Demand curve D₁ from Q₂ to Q₁ & Q_s increases on the supply curve S from Q_e to Q₁
- Q_s and Q_d change continuously until a new market equilibrium is reached
- At new market equilibrium, Equilibrium price increased from P_e to P₁



(ii) **Changes in Supply**

- Supply \uparrow from S to S_1 due advancements in state of technology
- Excess supply (surplus): $Q_e Q_2$
- Prices \downarrow
- Q_d increases from Q_e to Q_1 on demand curve D & Q_s decreases from Q_2 to Q_1
- Q_s and Q_d change continuously until market equilibrium is reached
- At new market equilibrium, Equilibrium price decreased from P_e to P_1



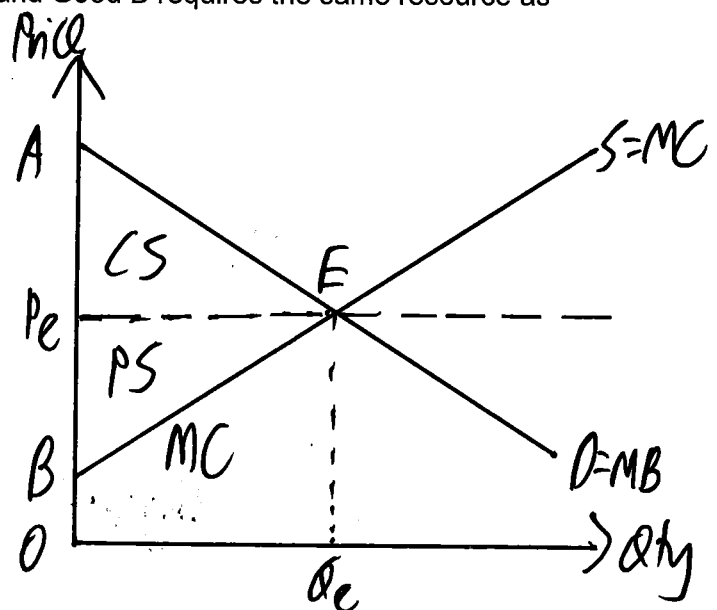
(iii) **Changes in both supply and demand**

- How the Q_e and P_e changes depends on how much supply/ demand changes
- Necessary to draw diagram to determine whether $P_e/Q_e \uparrow/\downarrow$

(e) **Interrelationships between markets**

1. **Complements:** Goods in joint demand (Tennis racket & tennis balls)
 - Demand for product varies **inversely** with price of complement good
2. **Substitutes:** Goods in competitive demand (chicken & beef)
 - Demand for product varies directly with price of substitute good
3. **Derived demand:** good is required to produce another good
 - Eg. steel & cars ($\uparrow D$ for cars, $\uparrow D$ for steel)
4. **Joint supply:** Goods produced jointly from the same resources (beef and leather)
 - When one good is produced, another good is produced at the same time
5. **Competitive supply:** Goods produced from the same resources (corn and maize)
 - When the resource is allocated for production of Good A, Good B cannot be produced as the resource is occupied and Good B requires the same resource as Good A to be produced.

(f) **Producer and Consumer surplus**



A: Maximum price consumers are willing to pay

B: Minimum price producers/firms willing to sell

Consumer surplus: Difference between the maximum price consumers are willing and able to pay for a good and what they actually pay for it (Area APeE for OQ units bought)

- Demand curve is a **Marginal Benefit (MB)** Curve
- MB: additional benefit to consumers for an additional unit of good consumed
- Willing to pay: OAEQe for output OQe
- Expenditure: OPeEQe
- Consumer surplus= Willing to Pay – Expenditure= APeE (for output OQe)

Producer surplus: Difference between the revenue that producers receive per unit of good and the minimum price at which they are willing to sell that unit of good for (Area BPeE for OQ units sold)

- Supply curve is a **Marginal Cost (MC)** Curve
- MC: additional cost to producers for an additional unit of goods produced
- Total **Revenue**: OPeEQe for output OQe
- Total Costs of production: OB'EQe
- Producer surplus (not profit)= Revenue – production cost= BPeE for output OQe

Societal Welfare & Allocative efficiency

- In a **free market** (absence of government intervention, supply & demand determine price), **market can reach equilibrium**
- At market equilibrium, **Supply=Demand & Consumer Surplus=Producer Surplus**
- **CS=PS** only when they are both maximised
- In the absence of externalities, **CS+PS= Societal Welfare**
- As **CS+PS is maximised, societal welfare is maximised**
- At market equilibrium, **MB=MC** (extra benefit to society for additional unit of good consumed= extra cost to producers for additional unit of good produced)
- It means **society's resources are allocated to produce the desired output of goods**
- Hence, **allocative efficiency** is achieved in a free market

Definition list

1	Market	Made of buyers/consumers, Producers/firms, price & a specific good/service (This is the distinction between market & economy)
2	Demand	Willingness & ability of consumers to buy various quantities of goods at various prices in a certain time period
3	Law of Demand	Negative relationship between price and Quantity demanded, ceteris paribus (Law of diminishing marginal utility)
4	Substitution effect	Consumers buy less of more expensive goods (which prices have increased) and switch to cheaper substitutes
5	Supply	Willingness and ability of producers to sell various quantities of goods at various prices in a certain time period
6	Law of Supply	Positive relationship between price and Quantity supplied, ceteris paribus (profit motivated producers)
7	Market Equilibrium	Quantity Demanded=Quantity supplied at an equilibrium price At this price, consumers maximise utility/satisfaction & firms maximise profits (OR) Producer Surplus=Consumer Surplus & both PS&CS are maximised
8	Complements	Goods in joint demand
9	Substitutes	Goods in competitive demand
10	Derived Demand	Good is required to produce other goods
11	Joint supply	Goods produced jointly from the same resource (eg when beef is produced from slaughtered cows, leather is produced in the process)
12	Competitive supply	Goods produced from the same resource, when 1 good is being produced, the other cannot be produced as the resource is occupied
13	Consumer Surplus	Difference between the maximum price consumers are willing and able to pay for a good and what they actually pay for it
14	Producer Surplus	Difference between the revenue that producers receive per unit of good and the minimum price at which they are willing to sell that unit of good for (Area BPeE for OQ units sold)
15	Marginal Cost	Additional benefit to consumers/society for an additional unit of good consumed
16	Marginal Benefit	Additional cost to producers for an additional unit of goods produced



Section 1: Microeconomics

Topic 2: Elasticities

1.2.1 Price Elasticity of Demand (PED)

PED: Responsiveness of the Quantity demanded to a change in price

$$\text{PED} = \frac{(\mp)\% \Delta Q_d}{\pm \% \Delta \text{Price}} = (-) \text{ magnitude eg. } (-)1.2$$

PED: Involves shifts **along** the demand curve

Along a curve, PED is not constant

Demand elastic: $\text{PED} > 1$ Demand Inelastic: $\text{PED} < 1$ Demand perfectly inelastic: $\text{PED} = 0$

Demand unit elastic: $\text{PED} = 1$

Determinants of PED (Factors affecting magnitude of PED)

1. Availability of substitutes

- More substitutes, larger PED
- Eg. Insulin injections (no substitute, Price Increase, minimal decrease in Q_d)
- Eg. Nike shoes (Many substitutes, eg Adidas, asics. Price Increase, larger decrease in Q_d .)

2. Degree of necessity

- Greater degree of necessity, smaller PED
- Eg Rice (basic necessity): Price increase, small decrease in Q_d , food necessary for survival/ Price decrease small increase in Q_d (Biological constraints)
- Eg. Prada bags (luxury goods): Price increase, larger decrease in Q_d

3. Proportion of income spent on good

- Compare: 50% Price↑ of matchbox (\$0.10 to \$0.15) vs 50% Price↑ of car (\$80000 to \$120000)
- Larger the proportion of income spent, larger the PED

4. Time

- As time passes, magnitude of PED increases

Reasons for initial low PED:

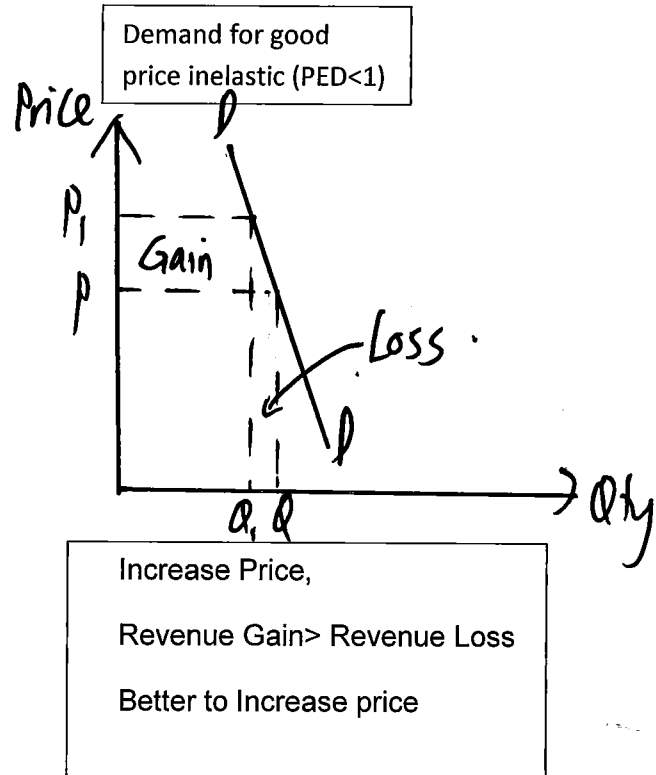
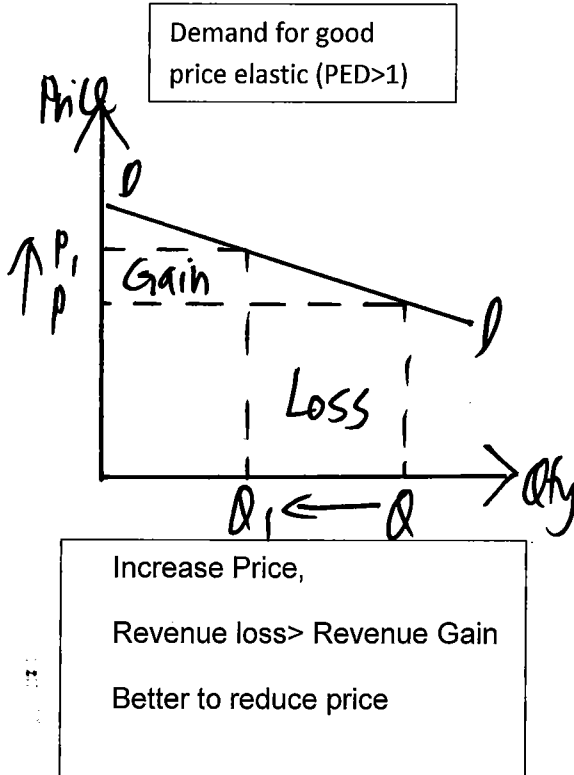
- Time required for news of price change to spread through community
- Time required to change consumption habits (goods that consumers may be addicted to)
- Durability of good (At the time when price of the good decreases, people may be in possession of the good that will last for a period of time eg. 3 months. Hence, there is no need to buy more and there is small increase in Q_d .)
- eg. cars (When prices increase)

- Initially, small PED (small pool of buyers, durability of cars eg. 5-10 years)
- After some time, PED increases (Cars get old and need to be replaced/ In response to increase in price, switch to public transport)

Applications of PED

1. Businesses considering whether to increase or decrease price of goods

- Allow businesses to **PLAN**



Relevance to other topics:

2. Government intervention

- Incidence of taxation and subsidies (PED affects amount of tax paid by consumers and producers)

3. Market Failure

- Evaluating effectiveness of imposing taxes, granting subsidies (policies)

4. Macroeconomics

- Effect of the change in currency exchange rate on the value of net exports (X-M), which will affect Aggregate Demand (AD)

1.2.2 XED (Cross Price Elasticity of Demand)

XED: The responsiveness of the demand of a good to a change in price of another good.

- Deals with connected goods (substitutes/complements)
- Involves shifts in the demand curve

For Complements, $XED = \frac{(\mp)\% \Delta D(\text{Good A/B})}{(\pm)\% \Delta (\text{Price B/A})} = (-)$ magnitude

For Substitutes, $XED = \frac{(\pm)\% \Delta D(\text{Good A/B})}{(\pm)\% \Delta (\text{Price B/A})} = (+)$ magnitude

Eg. Close complements: Tennis rackets & tennis balls

not-so-close complements: bicycle & bicycle lights

Close substitutes: Pepsi & Coca Cola

Not-so-close substitutes: apple and pears

XED=0: Unrelated goods

Determinants of XED

1. Degree of substitutability and complementarity

Eg. Close complements: Tennis rackets & tennis balls

not-so-close complements: bicycle & bicycle lights

Close substitutes: Pepsi & Coca Cola

Not-so-close substitutes: apple and pears

XED=0: Unrelated goods

2. Time factor

- Time↑, XED↓ (Possibly due to development of other substitutes/complements)

eg. Complements (Petrol and cars)

- Price (Petrol)↑, large ↓ in Demand (Cars)
- As time passes, development of alternative fuel sources (eg. biofuels) that are cheaper.
- Smaller ↓ in Demand (Cars) as more willing to buy cars with lower fuel cost, XED↓

Eg. Substitutes (Cars & taxis)

- Price (Cars)↑, large ↑ in Demand (Taxis) which are relatively cheaper
- As time passes, development of alternative methods of transport (eg. mrt, public buses)
- Smaller ↑ in Demand (Taxis), as public transport cheaper than taxis, XED↓

Applications of XED

1. SIGNALLING purpose for businesses

(a) Complements (Pepsi/Coca Cola)

- Price (Pepsi)↑, Demand (Coca Cola)↑, For Coca Cola producer: Increase stock
- Price (Pepsi)↓, Demand (Coca Cola)↓, For Coca Cola producer: Decrease stock, increase advertising

(b) Complements

- Price (Cars)↑, Demand (Petrol)↓, Petrol Producers/companies: Reduce supply/stock
- Price (Cars)↓, Demand (Petrol)↑, Petrol Producers/companies: Increase supply/stock

1.2.3 Income elasticity of demand (YED)

YED: Responsiveness of demand to a change in income

- Involves shifting of the entire demand curve
- Sign (±) is dependent on the nature of goods

Normal/luxury/superior good (eg. handbag, truffles, etc): **YED +ve**

Basic/inferior goods (eg. biscuits, pirated CDs): **YED -ve (normally)***

**refer to determinants of YED for explanation (dependent on level of household income/level of development of economy)*

$$\text{YED (Superior Goods)} = \frac{(\pm)\% \Delta D(\text{Good})}{(\pm)\% \Delta (\text{Income})} = (+) \text{ YED}$$

$$\text{YED (inferior goods)} = \frac{(\mp)/(\pm)\% \Delta D(\text{Good})}{(\pm)\% \Delta (\text{Income})} = (-)/(+) \text{ YED}$$

Determinants of YED (Magnitude)

1. Nature of Good

- Luxury goods: Larger YED (smaller degree of necessity/ more of a "want")
- Inferior goods: Smaller YED (Larger degree of necessity, eg survival/ more of a "need")
- Primary products (from extractive industries; eg rice), Secondary products (from manufacturing industries; eg clothes/cars), Tertiary products (Services)

Generally speaking YED(TP)>YED(SP)>(PP)---to do with degree of necessity

2. Level of household income/state of development of economy

Eg: Developing country (Myanmar) vs Developed Country (Singapore)

a. Developing country (low GDP/capita)

- **Inferior goods:** Y↑, larger ↑D (Rice)---due to low income base, could not afford sufficient rice before increase in income
- **Luxury goods:** Y↑, very small ↑D (Cars)--- due to larger spending on basic goods, low income base

b. Developed country (Higher GDP/capita)

- **Inferior goods:** Y↑, large ↓D (cheap bags)--- Substitution effect, substitute with more luxurious goods
- **Superior Goods:** Y↑, large ↑D (Branded bags)--- high income base/high income means expenditure on basic goods (rice) is only small proportion of income and sufficient income to buy more luxury goods

Applications of YED

- Understanding nature of good allows producers to plan output of goods when income changes

Types of goods

Primary Goods (Primary Sectors)	Extractive industries (agriculture; eg rice/ coal mining) Developing economies have large primary sectors (Cambodia)
Secondary Goods (Secondary sectors)	Manufacturing industries (eg cars/clothes) Industrializing economies have large secondary industries (Indonesia/China)
Tertiary Goods (Tertiary Sectors)	Service industries (McDelivery, massage, hair salons) Developing economies have large tertiary sectors (Singapore)

How producers in different economies will be affected by change in income

Developing Economy	Industrializing economy	Developed economy
Large primary sectors Extractive industries (eg. agriculture) Rice, coal, oil	Large secondary sectors Manufacturing industries Eg. clothes, cars	Large tertiary sectors Service sectors Eg. massage, hair salons
<u>Increase in income</u> Eg. rice $Y \uparrow, D(\text{Rice}) \uparrow^*$ due to low income base Producers in such countries \uparrow output (This is diff. for developed economies) <i>Consult Textbook for alternative explanation</i>	<u>Increase in income</u> Eg. cars $Y \uparrow, D(\text{cars}) \uparrow$, as cars are a luxury good $\uparrow D(\text{SP}) > \uparrow D(\text{PP})$ Producers increase output	<u>Increase in income</u> Eg. massage services $Y \uparrow$, large $\uparrow D(\text{massage})$, due to high income base, can already afford primary and secondary goods $\uparrow D(\text{TP}) > \uparrow D(\text{SP})$ Signals producers to increase output
<u>Decrease in income</u> $Y \downarrow, D(\text{Rice}) \downarrow$, already low income base, cannot afford enough basic goods before? <i>Consult Textbook for alternative explanation</i>	<u>Decrease in income</u> $Y \downarrow, D(\text{cars}) \downarrow$, switch from luxury to basic goods $\downarrow D(\text{SP}) > \downarrow D(\text{PP})$ Producers decrease output	<u>Decrease in income</u> $Y \downarrow$, large $\downarrow D(\text{massage})$ Switch to basic goods as tertiary goods have low degree of necessity. $\downarrow D(\text{TP}) > \downarrow D(\text{SP})$ Producers decrease output significantly

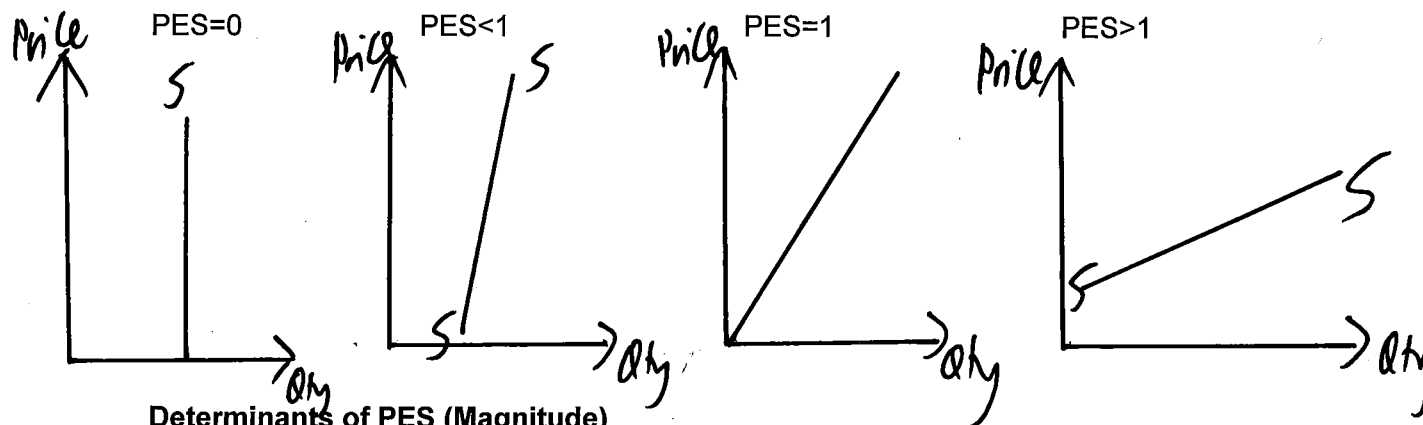
**Generally Speaking, in developing countries, a large majority of people have low income bases. Although there may be a small proportion of people who have higher incomes and will buy LESS basic goods if income increases, the number of "poorer" people who have low incomes and will buy more basic goods if income rises outweighs those who will buy more basic goods.*

1.2.4 Price Elasticity of Supply

PES: Responsiveness of the Quantity Supplied to a change in Price

$$PES = \frac{(\pm)\% \Delta Q_d}{\pm \% \Delta Price} = (+) PES$$

➤ PES involves shifts **along** the Supply curve



1. Existence of spare productive capacity

- Refers to the amount of unemployed/unused resources
- Larger the amount of spare productive capacity, easier to increase output when price increases
- ∴ larger PES

2. Availability of stock

- Goods that **can be stored** for period of time after production with minimal loss of quality (eg. iPhones) have large PES.
When Price increases, producers can sell iPhones that are in storage
- Goods that are perishable and cannot be stored (eg. bananas: will rot after some time) have low PES.
Price↑, small ↑QS(Bananas) as there are very little bananas stored from before the increase in price
Price↓, small ↓QS(Bananas) as supply of bananas cannot be reduced by storing them for future sales.

3. Time Factor

- Refers to time required to produce the good
- Goods that require longer periods of time to produce (eg. rice) have a smaller PES.
P↑, small ↑QS(bananas), as time required to increase output
P↓, small ↓QS(bananas), as cannot halt output of bananas halfway when it is grown/place in storage
- Goods that can be produced in a shorter period of time (iPhones) have a larger PES
P↑, larger ↑QS(iPhones), as output can be increased in a shorter time period when price increases

4. Factor mobility

- The more easily which a factor of production (esp. labour) can be directed towards the production of a good, there larger the change in Qs in response to a change in Price, ∴ larger PES

Definition List

1	PED	Responsiveness of the quantity demanded to a change in price
2	XED	Responsiveness of the demand of a good to a change in price of another good
3	YED	Responsiveness of the demand for a good to a change income
4	PES	Responsiveness of the quantity supplied to a change in price
5	Normal Goods	Basic necessities (eg. rice)
6	Superior Goods	Luxury goods/goods with smaller degree of necessity (cars, wine, truffles)
7	Primary Sectors	Extractive industries, produces primary goods which are normally natural resources (eg. rice, coal, oil)
8	Secondary Sectors	Manufacturing industries, produces manufactured goods which are secondary products (eg, cars, clothes)
9	Tertiary Sector	Service sectors (eg. massage, hair salons)

Section 1: Microeconomics

Topic 3: Government Intervention—Taxation, subsidies, Price floors, Price ceilings

Emphasis for topic 1.3: Stakeholder effects

1.3.1 Taxation

Indirect Tax: Tax imposed on spending to buy goods and services. It is partially paid by consumers, but the producers pay the government directly.

Direct Tax: Paid by taxpayer directly to government

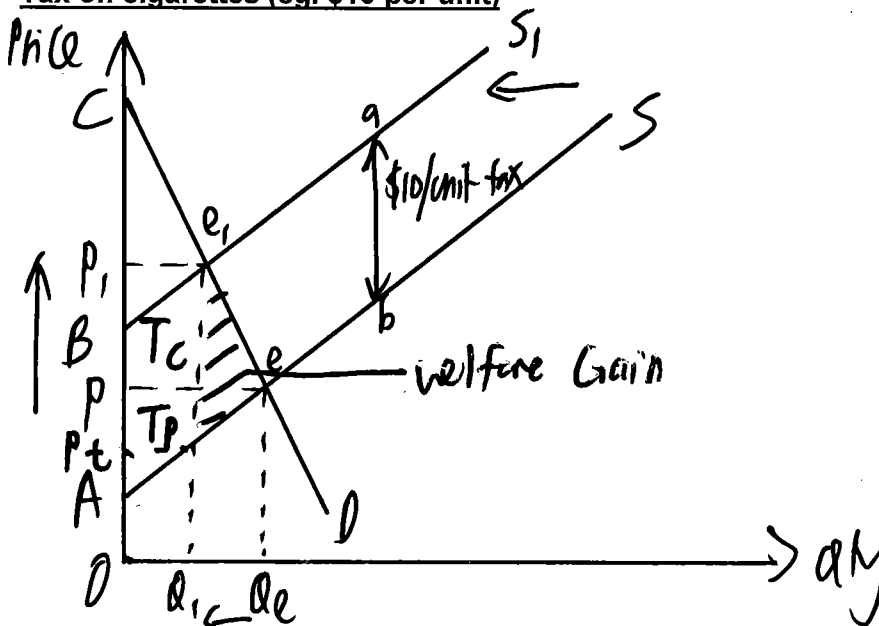
Types of indirect tax:

1. **Excise tax** (*main focus*): imposed on goods such as cigarettes, alcohol (demerit goods with negative externalities), gasoline (negative externality: pollution), jewellery (luxury good for rich)
2. Tax on spending for normal goods and services (eg. GST, VAT)

Reasons Governments impose taxes

1. Source of government revenue
2. Reduce over-consumption of demerit goods (cigarettes, alcohol), remove negative externalities in consumption/production, restore social efficiency, correct market failure
3. Redistribute income, reduce income inequality
Eg. Expensive jewellery: only affordable to rich, tax on jewellery to grant subsidies for low income groups.

Tax on cigarettes (eg. \$10 per unit)



- Indirect tax (ab= \$10/unit) increases Marginal Cost of production, reducing supply from S to S1. Price increases from P_e to P_1 and Equilibrium Qty increases from Q_e to Q_1
- Total tax yield= T_c (Tax on consumers) + T_p (Tax on producers)

Stakeholder effects of a tax on cigarettes

1. Consumers

- Consumer Surplus ↓ ($P_e e_C$ to $P_1 e_1 C$)
- As $PED < 1$ for cigarettes, $T_c > T_p$
- As $PED < 1$, large amount of tax needs to be levied to reduce equilibrium quantity of cigarettes. Adverse impact on low income groups

2. Producers

- $MC \uparrow$, producer surplus ↓ ($P_e e_A$ to $P_1 e_1 B$)
- Revenue ↓ ($OP_e e_Q_e$ to $OP_1 e_1 Q_1$)

3. Society

- Welfare gain (Area aee_1), as cigarettes are a demerit good
- Overconsumption reduced, external cost of consumption of cigarettes removed, restores social efficiency ($MSB = MSC$), correcting market failure

4. Government

- Tax Revenue (Revenue can be used to compensate affected parties)
- $PED \text{ cigarettes} < 1$, higher tax yield

General observations about PED

1. $PED < 1$, $T_c > T_p$
 $PED > 1$, $T_p > T_c$
2. $PED < 1$, smaller ↓ in Q_e
 $PED > 1$, larger ↓ in Q_e
3. $PED < 1$, larger tax yield
 $PED > 1$, smaller tax yield

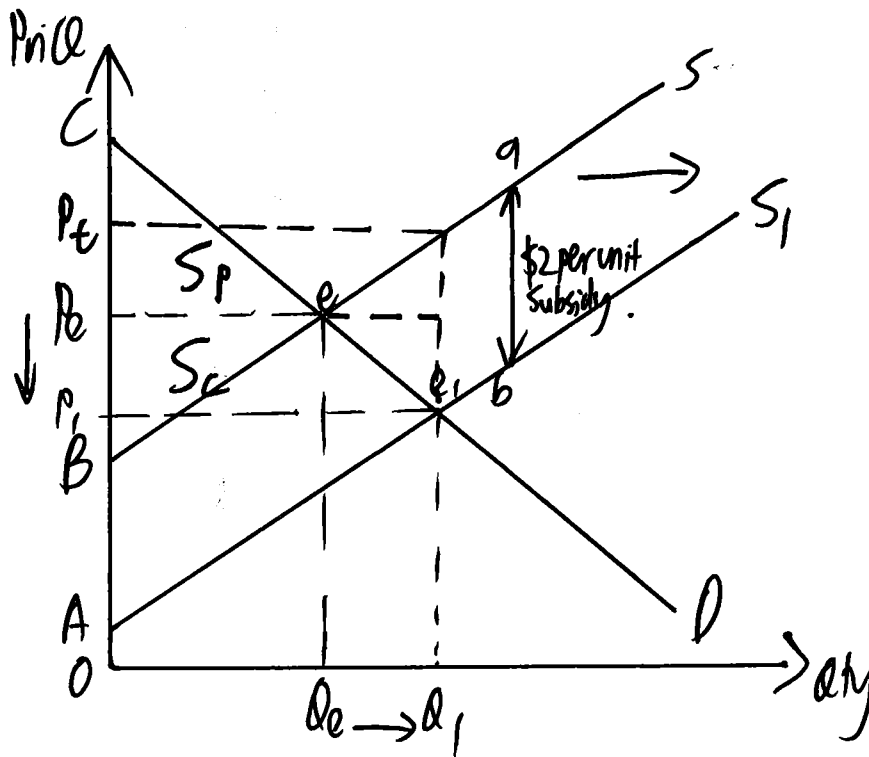
1.3.2 Subsidies

Subsidies: Government grants to firms to reduce price (Cost of production) and increase supply.

Reasons subsidies are granted

1. Increase revenues of producers
 2. Increase affordability of goods for low income consumers
 3. Increase consumption/production of a merit good
 4. Removes external benefit from consumption/production of a good with positive externalities, restoring social efficiency and correcting market failure
 5. Support growth of particular industries
- Subsidies increase supply and increase equilibrium quantity of goods. Increases output of a good in a certain industry, causing the industry/sector to grow/expand

Subsidy on vaccines (eg \$2 per unit)



- Subsidies reduce the Marginal Cost of Production, increasing supply from S to S_1 . Equilibrium price decreases from P_e to P_1 and equilibrium quantity increases from Q_e to Q_1
- Total subsidy = S_P (Subsidy on producers) + S_C (subsidy on consumers)

Stakeholder effects

1. Consumers

- Consumer surplus \uparrow ($P_e e C$ to $P_1 e_1 C$)
- $PED < 1$ for vaccines (health: necessity), $S_C > S_P$

2. Producers

- Marginal Cost of production \downarrow , Producer Surplus \uparrow ($P_e e B$ to $P_1 e_1 B$)
- Revenue \uparrow ($OP_e e Q_e$ to $OP_1 e_1 Q_1$)

3. Society

- Welfare gain (merit good)
- Removes under consumption, removes the external benefit of consumption of vaccines, restores social efficiency ($MSB = MSC$), corrects market failure

4. Government

- Government incurs an opportunity cost, as there will be less expenditure for other sectors in society
- May result in the imposition of taxes to finance subsidies

General Observations

1. $PED < 1$, $S_C > S_P$
 $PED > 1$, $S_P > S_C$

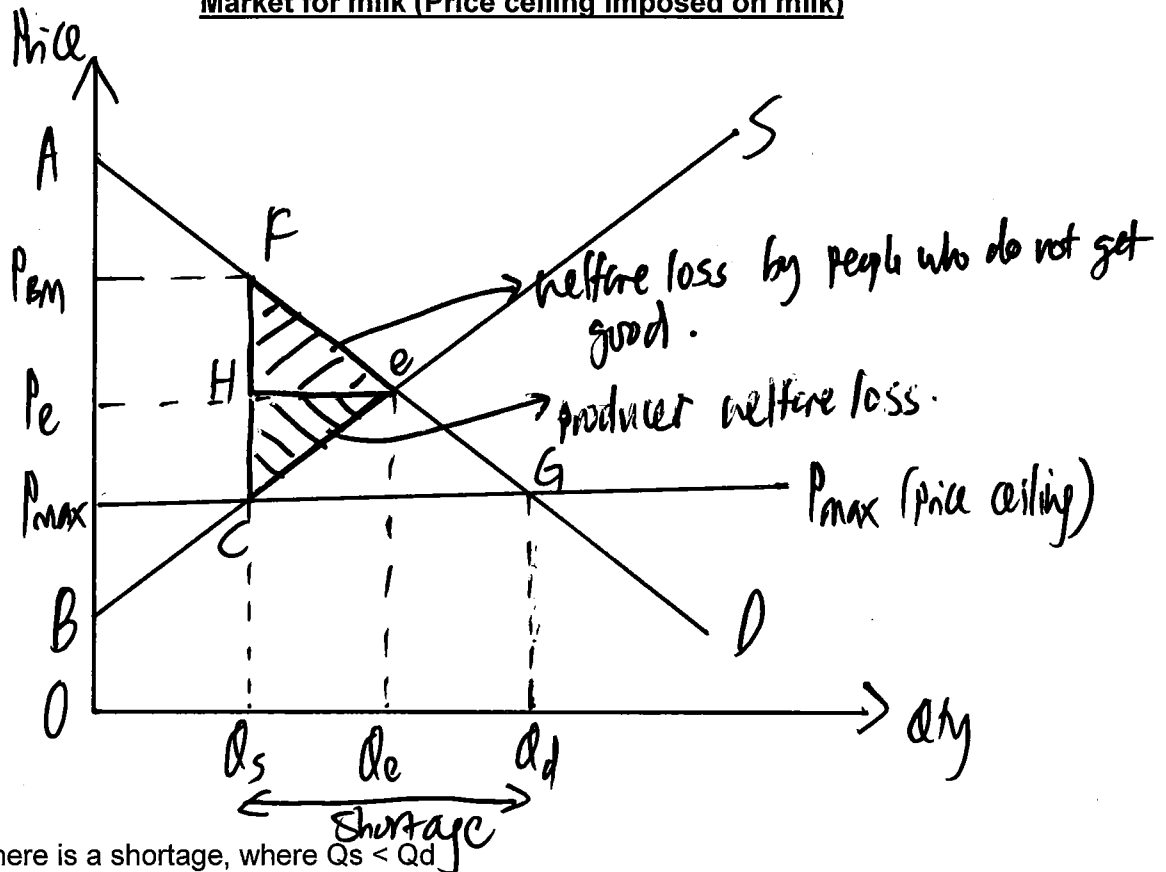
1.3.3 Price Controls

- Price controls are the setting of minimum or maximum prices by the government, such that prices cannot adjust to the equilibrium price determined by market forces of supply and demand. This results in market disequilibrium, resulting in shortages or surplus

(a) Price Ceiling

- Legal maximum price set below the market equilibrium price
- Purpose: Allow low income households to afford essential goods & services (eg basic necessities, (eg milk)

Market for milk (Price ceiling imposed on milk)



At P_{max} , there is a shortage, where $Q_s < Q_d$

Stakeholder effects

1. Consumers

(+ve)

- Lower price, more affordable
- Consumer surplus \uparrow
Net increase in consumer surplus
Welfare loss: FHe (Those who do not manage to get the good due to the shortage)
Welfare gain: $P_e H C P_{max}$
 \therefore Consumer surplus increases from $P_e E a$ to $P_{max} C F A$

(-ve)

- **Shortage**, welfare loss for those who cannot get the good
- Market disequilibrium means Price mechanism cannot perform "rationing" function. The quantity supplied is distributed by **non-price rationing** methods
(i) Queues (first come first serve basis)—inefficiency

- (ii) Suppliers ration according to personal biases
- (iii) Government Rationing (eg. distributing ore coupons to lower income groups)
Unpopular, richer who can afford do not get good

➤ **Black Markets**

Some illegal producers/distributors buy up market supply and sell them at high black market prices (P_{BM})

Only the richer can afford and low income groups suffer

2. **Producers**

(-ve)

- Producer surplus ↓ ($P_e e B$ to $P_{max} C B$)
- Revenue ↓ ($OP_e e Q_e$ to $OP_{max} C Q_s$)
- Revenue ↓ for producers of complementary goods
- Producers of milk leave industry/loss of livelihood

(+ve)

- Revenue ↑ for producers of substitute goods

3. **Workers**

- Decrease in wages
- Increase in unemployment

4. **Society**

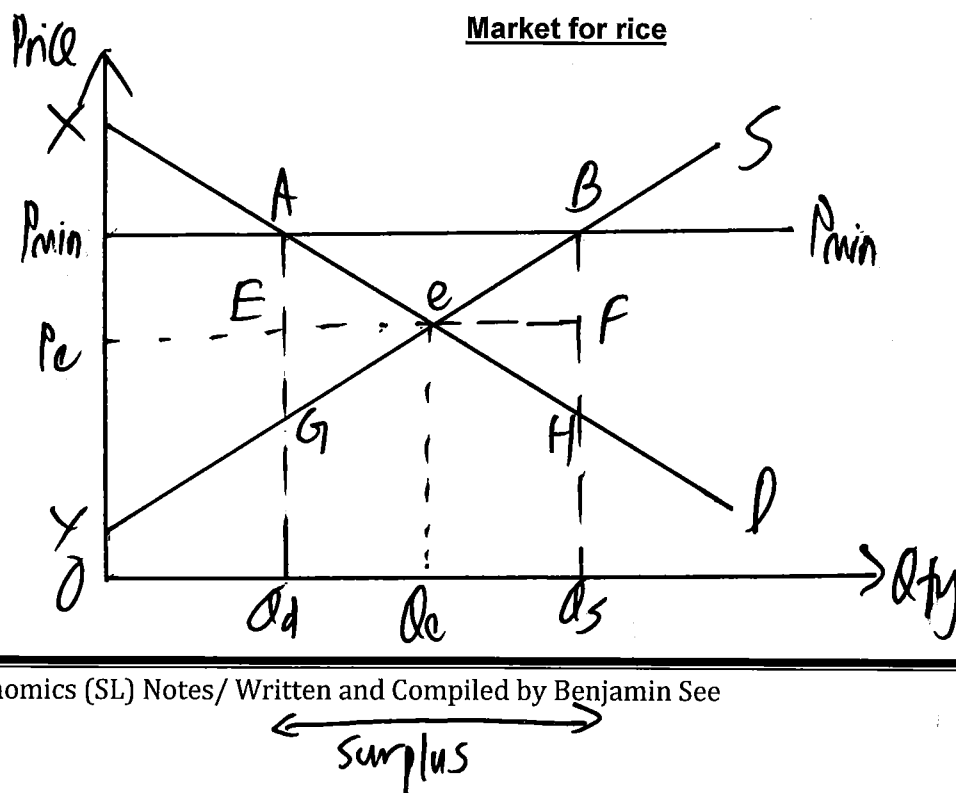
- Underproduction, allocative inefficiency

5. **Government**

- No gains/losses in government budget/ little government expenditure
- Gains political popularity amongst groups benefitted.

(b) **Price floor**

- Legal minimum price that is set above the market equilibrium price
- Purpose: to help low income producers (eg. rice farmers in Thailand)



- At P_{\min} , there is a surplus ($Q_s > Q_d$)

Stakeholder effects

1. Consumers

- Pay higher price
- Consumer surplus ↓ ($P_e eX$ to $P_{\min} eX$)

2. Producers

(+ve)

- Higher price, benefits low income producers
- Revenue ↑ ($OP_e eQ_e$ to $OP_{\min} BQ_s$) if government buys up surplus
- Producer surplus ↑ ($P_e eY$ to $P_{\min} BY$)

(-ve)

- Inefficient production
Higher prices dismisses incentive to cut production cost
Government buying up surplus guarantees higher revenue/profits
- 3. Workers**
 - Increase in wages/ employment rate if government buys up surplus
- 4. Society**
 - Overproduction, allocative inefficiency
- 5. Government**
 - **Large government expenditure** required to buy up excess supply of rice, government incurs opportunity cost
 - Accumulation of surplus goods necessitates **high transport and storage costs**
 - Large expenditure may mean imposition of high taxes/ reallocation of expenditure from other sectors
 - Governments in less developed economies may not be able to afford to buy up surplus
- 6. Foreign economies**

Government may sell surplus goods (eg. rice) at low world market prices

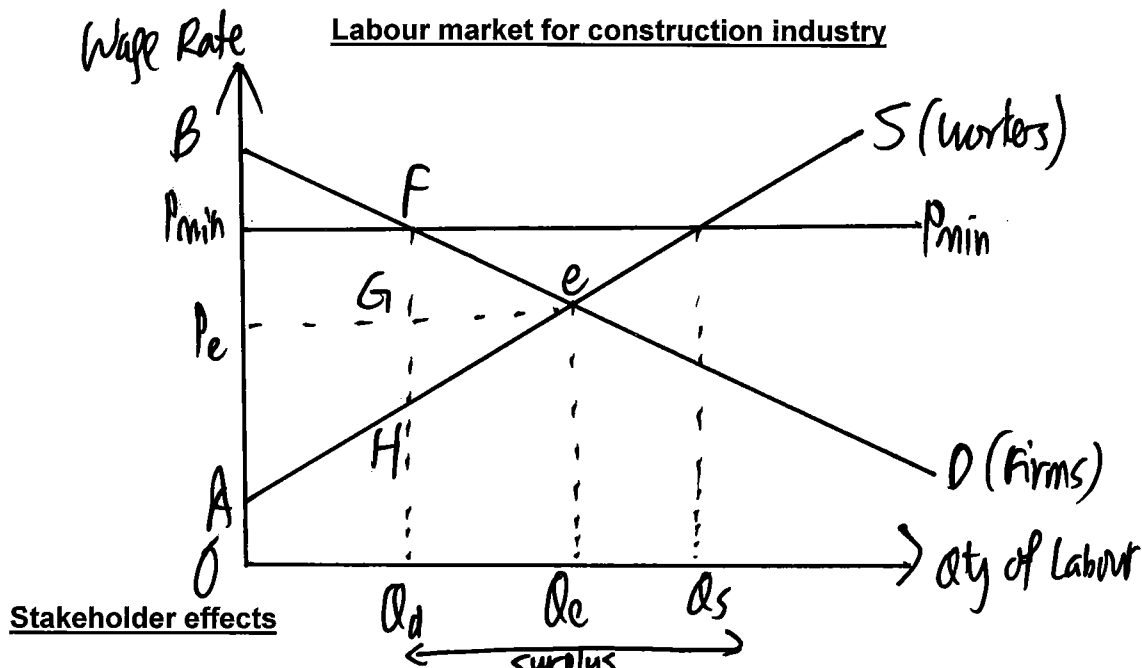
(+ve) Consumers in foreign countries may benefit from lower prices

(-ve) Local producers of rice lose out

- Consumers substitute locally produced rice with cheaper imported rice
- Causes local farmers in foreign economies to lose jobs/ loss source of livelihood.

Extension: Applications of Price floor—Minimum Wage

- Purpose is to guarantee adequate income for low income workers (unskilled jobs) to they can afford basic necessities (eg food/healthcare) for better living standards



- Workers** (difference from price floor: Govt does not buy up surplus labour)
 - Labour surplus, structural unemployment ($Q_s - Q_d$)
 - More unskilled workers lose jobs
 - Mixed effect on workers
 - Those who get higher pay gain (Gain in worker surplus: $P_{min}P_eGF$)
 - Those who lose jobs lose out (Loss in worker surplus: GHe)
- Firms**
 - Higher cost of production, lower revenue (Cannot analyse revenue from labour diagram)
 - Employer surplus ↓ ($P_e eB$ to $P_{min}FB$)
- Consumers**
 - Decrease in supply of goods (especially cheap goods produced by low income low skilled workers)
 - Increase in price of goods
- Whole economy/society (Debatable, with alternative perspectives)**

(-ve)

- Loss in worker/employer welfare/surplus (Area $FGHe$)
- Increase in structural unemployment ($Q_s - Q_d$)
- Macroeconomics link:** Increasing natural rate of unemployment, increasing rate of unemployment, causing economy to produce at $< Y_{FE}$, LRAS shifts left, economy's potential output decreases
- Illegal workers (eg. illegal immigrants) working at wages below minimum wages

(+ve)

- Increased labour productivity (low skilled workers may have more motivation to work with higher pay)
- Reduced income inequality

Definition List

1	Indirect Tax	Expenditure tax, partly paid by consumers and producers, but producers pay government directly (may be for demerit goods)
2	Subsidies	Government grant to increase supply and reduce prices (may be for merit goods)
3	Price Control	Setting of maximum /minimum prices by the government such that prices cannot adjust to market equilibrium. Market Disequilibrium results, resulting in shortages and surplus
4	Price Ceiling	Legal maximum price that is set below the equilibrium price
5	Price Floor	Legal minimum price that is set above the equilibrium price



Section 1: Microeconomics

Topic 4: Market Failure

Focus for Market Failure: Policies/solutions correcting market failure and evaluation of these policies/solutions

1.4.1 Introduction to Market Failure, market efficiency, social efficiency, externalities

Market Failure: Failure of the market to achieve efficiency in the allocation of resources, resulting in an over allocation of resources or the under allocation of resources in the absence of government intervention

Economic efficiency in a private market: $MPC=MPB$

Social Efficiency (society): $MSB=MSC$ in the absence of externalities (eg. EB/EC)

- In the absence of externalities, $Q_e=Q_{OPT}$, $MPC=MSC$, $MPB=MSB$

MPC: Cost to producers of an additional unit of good produced

MPB: Benefit to consumers of an additional unit of good consumed

Externalities (EB/EC): 3rd party costs/benefits of the production/consumption of a good borne by parties not involved in the production/consumption activity

MSC: Cost to society for an additional unit of goods produced

MSB: Benefits to society for an additional unit of goods consumed

Positive Externalities

Production: Providing training for workers (benefits other firms which workers may work for), education----- $MSC=MPC+EB$

Consumption: Vaccines, healthcare (Benefit to community in which protected/healthy person lives in) ----- $MSB=MPB+EB$

Negative externalities

Production: electricity production using coal (pollution, global warming) ---- $MSC=MPC+EC$

Consumption: Cars (noise, pollution), cigarettes (2nd hand smoke) ----- $MSB=MPB+EC$

Positive externalities: $MSB>MSC$

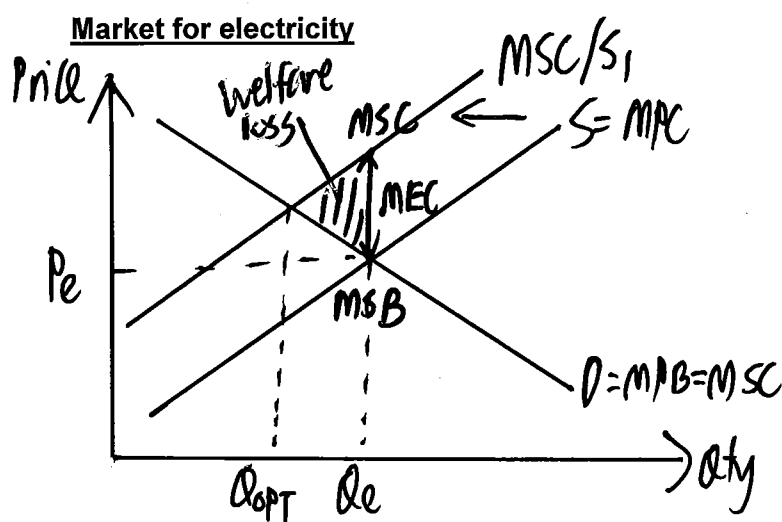
Negative externalities: $MSC>MSB$

Government intervention: Market Based solutions (Indirect tax, subsidies), Legislation (bans, quotas), education/provision of information, government provision

1.4.2 Market Failure and Government Intervention

1.4.2.1 Negative externalities of production

Eg. Electricity Production by coal (3rd party effect: Pollution, Global warming)



Market Failure

1. $MSC > MSB$
2. Welfare loss
3. Overproduction of electricity ($Q_e - Q_{OPT}$)

Government Intervention (To reduce production)

1. Market Based solution

(a) Indirect tax

- Government levies tax equivalent to MEC
- Increases cost of production, reducing supply from S to S_1 (where $Q_e = Q_{OPT}$), where $MSC = MSB$, restoring social efficiency, correcting market failure

Advantages	Disadvantages
<ul style="list-style-type: none"> ➤ Tax revenue for government, can be used to subsidise R&D for cleaner technologies ➤ Incentives for firms to develop & switch to cleaner technologies ➤ Tax variable to magnitude of problem 	<ul style="list-style-type: none"> ➤ Difficult to estimate value of MEC and levy accurate amount of tax ➤ Correcting market failure reduces economic output (eg. more expensive electrical bills lead to higher cost of production for industries), reducing economic growth ➤ Electricity a basic good ($PED < 1$), high tax required to sufficiently reduce Q_e to Q_{OPT}

(b) Tradable (pollution) permits

- Used for pollution control/ natural resource management (eg. forests, fish)
- Tradable pollution permits: Government sets up market for pollution, issue firms with permits allowing them a certain limit of pollution (eg. EU Emission Trading system)
- If firms want to pollute more, need to buy permits from less polluting firms

Advantages	Disadvantages
<ul style="list-style-type: none"> ➤ Incentive to cut pollution/develop cleaner technologies, which allow firms to sell permits for larger revenue 	<ul style="list-style-type: none"> ➤ Administratively costly ➤ Firms with higher financial power see no incentive, cost of permits are low to them

<ul style="list-style-type: none"> ➤ Minimal Government spending (More polluting firms subsidise less polluting firms) ➤ Less polluting firms drive more polluting firms out of business 	<ul style="list-style-type: none"> ➤ Political favouritism/corruption by government ➤ Lack of technical information on acceptable volume of pollutants emitted
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2. Legislation

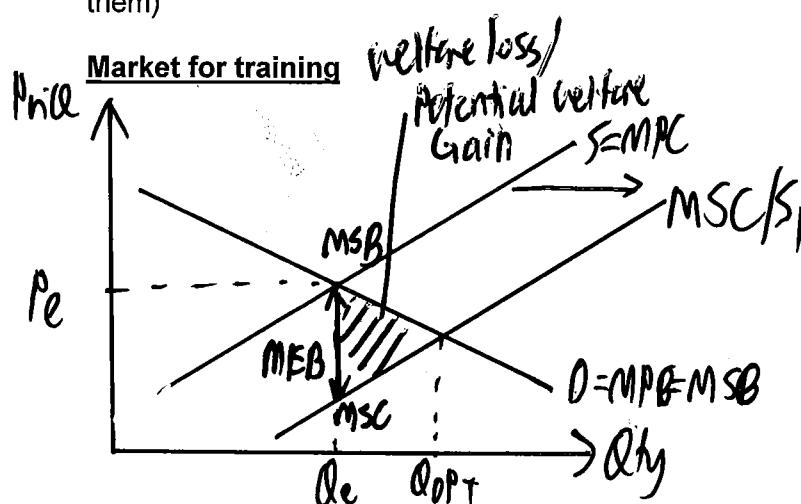
- Laws controlling businesses (eg. licenses, standards, laws, rules)
- Eg. Requirement to install pollutant filters/scrubbers, Ban production of good has an external cost in its production

Advantages	Disadvantages
<ul style="list-style-type: none"> ➤ Simpler and easier than taxes (safer to ban than allow firms to continue polluting with tax) ➤ Easy to implement as most power production firms are government owned ➤ Effective if EC is large 	<ul style="list-style-type: none"> ➤ Not a market based solution, no incentive to cut pollution ➤ Corruption ➤ Manpower required to monitor and enforce (costly) ➤ Penalties need to be sufficiently severe to deter firms from going against the law

1.4.2.2 Positive externalities of production

Eg. Firms providing workers with training (3rd Party effect: Other firms that workers work for will benefit from skills of worker)

Eg. Education (3rd party effect: benefit firms when educated people grow up and work for them)



<u>Market Failure</u>
1. MSB > MSC (Social Inefficiency)
2. Potential welfare gain/welfare loss
3. Underproduction ($Q_{OPT} - Q_e$)

Government intervention (Increase production)

1. Market Based solution (Subsidies)

- Government levies subsidy equivalent to MEB
- Reduces firms cost of production (cost of labour to train), increases supply of training from S to S₁ (where Q_e = Q_{OPT}), where MSC = MSB, restoring social efficiency, correcting market failure
- Eg. subsidies for training, subsidies for private/non-government funded schools

Advantages	Disadvantages
<ul style="list-style-type: none"> ➤ Incentive to develop good practices (sending workers for 	<ul style="list-style-type: none"> ➤ Difficult to estimate value of MEB and levy accurate amount of subsidy

training) ➤ Increases labour productivity (better skills) ➤ Reduces structural unemployment (firms willing to hire workers with incompatible skills as their training is subsidised)— <i>Macroeconomics link</i>	➤ Government incurs opportunity cost in expenditure for subsidies
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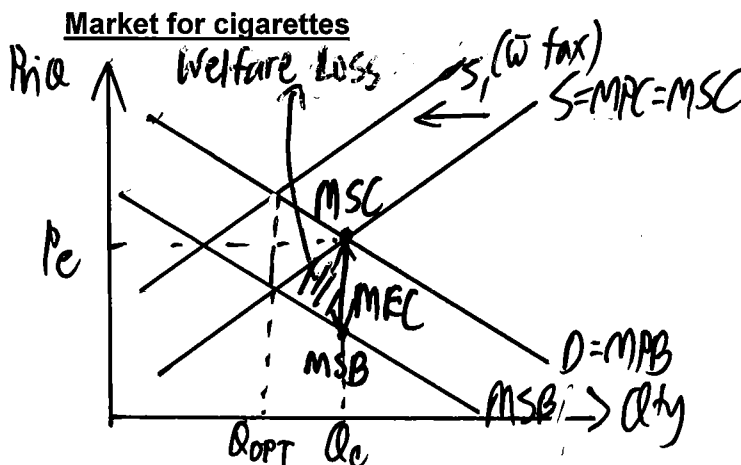
2. Public Provision

- Government sets up training centres to train workers in certain industries.
- Also to allow workers to discover career opportunities.
- Eg. Singapore: Continuing Education and Training (CET) centres
- Eg. In most countries (eg. Singapore): Free Primary and Secondary education in public schools (Government pays for education)

Advantages	Disadvantages
➤ Generates employment and income for workers on a short term basis ➤ Reduces structural unemployment , increase economic output ➤ Allows low income groups to get jobs (no need to pay for training)/get access to basic education	➤ Government incurs opportunity cost in setting up and running centres ➤ Time lag in implementation of training ➤ Difficulty in diagnosing needs of labour market and providing accurate and relevant training

1.4.2.3 Negative externalities of consumption

Eg. Cigarettes (3rd party effect: 2nd hand smoke), Cars (3rd party effect: air pollution/noise), Alcohol (3rd party effect: drink driving causing car accidents)



Market Failure

1. $MSC > MSB$
2. Welfare loss
3. Overconsumption ($Q_c - Q_{OPT}$)

Government intervention (To reduce overconsumption)

1. Market Based Solution

a. Indirect Taxation

- Government levy tax equivalent to value of MEC
- Increases cost of production, Reduce supply from S to S_1 (towards MSC curve), where $Q_c = Q_{OPT}$, restoring social efficiency ($MSC = MSB$), correcting market failure

Advantages	Disadvantages
➤ Government revenue , compensate affected parties (eg. subsidise healthcare)?	➤ Difficult to estimate value of MEC and levy right amount of tax ➤ Large amount of tax required to reduce equilibrium quantity, $PED < 1$

	for cigarettes. Low income groups negatively affected. ➤ High tax may lead to smuggling activities . (Smuggling cheaper cigarettes from abroad)
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b. Subsidies (electric cars)

- Subsidies on less polluting cars (electric cars)
- Advantages: Lower price, incentive to buy
- Disadvantages: Cars generally have $PED < 1$ (depending on country; availability of public transport). **High subsidies required** to increase equilibrium quantity of electric cars significantly. **Opportunity cost for government** (High expenditure)

Alternative policies (market failure of cars): Subsidies on public transport, development of public transport network and infrastructure (from tax revenue)

2. Legislation

- Laws regulating use of good
- Eg Cigarettes: In Singapore, no smoking in crowded public areas
- Eg alcohol: In Singapore, no consumption of alcohol in public between 2230 and 730
- Eg. Cars: Car pool lanes in USA

Advantages	Disadvantages
<ul style="list-style-type: none"> ➤ Easy to implement ➤ Laws/restrictions may change consumption habits of consumers 	<ul style="list-style-type: none"> ➤ Large amount of manpower required to monitor and enforce (costly). In China, insufficient enforcement ➤ Penalties for violation needs to be severe enough

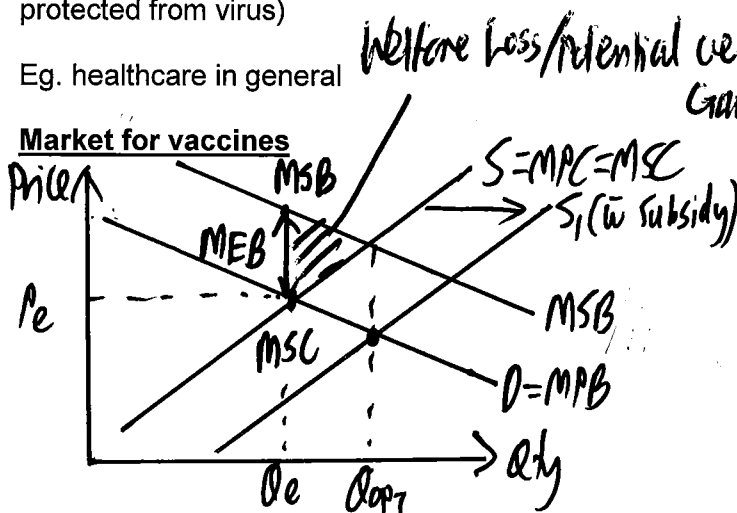
3. Education/provision of information

- Campaigns/ programmes in schools that discourage consumption of good/ change consumption habits of consumers
- **Disadvantage:** High cost & long term solution with no certain outcome

1.4.2.4 Positive externalities of consumption

Eg. Vaccines (3rd party effect: community in which vaccinated protected person lives in is protected from virus)

Eg. healthcare in general



Market Failure

1. $MSB > MSC$
2. Potential welfare gain/welfare loss
3. Under consumption ($Q_{OPT} > Q_e$)

Government intervention (To reduce under consumption)

1. Market Based solution (subsidy)

- Levying per unit subsidy equivalent to value of MEB
- Reduces production cost (labour cost for healthcare increasing Supply from S to S_1 (towards MSC curve), where $Q_e = Q_{OPT}$, restoring social efficiency ($MSB = MSC$), correcting market failure

Advantages	Disadvantages
<ul style="list-style-type: none">➤ Ensures benefit is passed to consumers	<ul style="list-style-type: none">➤ Difficult to estimate value of MEB and levying accurate amount of subsidy➤ Developing countries cannot afford such subsidies➤ High government expenditure (Opportunity cost). Reallocation of expenditure from other sectors/imposition of taxes

2. Legislation

- Laws enforcing greater consumption of healthcare
- Eg Singapore: Compulsory polio vaccinations for new born @ birth

Advantages	Disadvantages
<ul style="list-style-type: none">➤ Straightforward, easily put forward to doctors/hospitals	<ul style="list-style-type: none">➤ Manpower required to monitor and enforce laws (costly)

3. Direct provision

- Government identifies the Q_{OPT} , provides shortfall
- Government may take over production of good (eg. vaccines/healthcare)
- Eg. reduction in private healthcare institutions, more public healthcare services available (Polyclinics in Singapore/provision of vaccinations for school children)

Advantage	Disadvantage
<ul style="list-style-type: none">➤ Qty of vaccines/healthcare most likely Q_{OPT}	<ul style="list-style-type: none">➤ Difficult to estimate Q_{OPT}➤ Financing direct provision costly, opportunity cost for government (Imposition of taxes, reallocation of expenditure from other sectors)➤ Developing countries may not be able to afford direct provision➤ Government provision reduces choice of goods/healthcare services

1.4.3.1 Types of goods

Private Goods	Public Goods
<u>Characteristics</u> Rivalrous (diminishable) Excludable (price) Eg. cigarettes, cars, taxi services	<u>Characteristics</u> Non-rivalrous Non-excludable (No market price) Eg. National defence, streetlights, lighthouses, radio

Merit Goods	Demerit Goods
Goods that may have positive externalities Government encourages consumption Subsidies to increase Q_e Eg. healthcare, education	Goods that may have negative externalities Goods that gvt discourages consumption Taxation to reduce Q_e Eg. Cigarettes, alcohol

Merit and Demerit Goods are both private goods

Quasi-Public Goods

- *Partial excludability, partial rivalry*
- *Can provide benefit to public, but can also be restricted*
- *Eg. Roads (Singapore: ERP)*

1.4.3.2 Missing Markets for public goods

- Once an individual has access to public goods, others are benefitted
- People do not pay as it is **non-excludable**
- **Free Rider Problem**, People do not pay if they can drool/free-ride off others
- In the **private sector**, firms (profit maximising), do not produce the good as there will be **no market price**
- Hence, in a **Free market**, **Market Failure for public goods: Non-Provision**

1.4.4 Common Access Resources

- **Free Good**, exists in **nature** (not man-made), **no opportunity cost** (free)
- Eg. fish in the sea, forests, rivers, clean air
- In its natural state, there is **no private ownership** of the resource
- They are **non-excludable** (due to lack of private ownership), and **rivalrous** (limit to the amount of resource)
- Hence, they can be **overused**
- **Egs of overuse: overfishing, excessive deforestation, over pollution (air & water).** All have 3rd party costs (illustrated using a Market Failure diagram)

Threat to sustainability

- Sustainability: satisfying the needs of present generations without compromising the ability of future generations to meet their needs
- Overuse of common access resources (eg. overfishing) are not sustainable in the long run

- **Necessitates government intervention**

Government Intervention (For CA resources in general)

1. Privatising Resources (*Underlying issue with CA resources is lack of property rights*)
 - Gvt assigns resource to private landowners/firms, eg. charging fishermen for fishing (+ve: excludability)

(-ve)

- **Impractical**, CA resource is often spread over very large area (forests, seas)
 - Low income fishermen/farmers (who use slash & burn techniques) cannot earn a living
2. **Quotas** (limits): fishing (reduces rivalry)
 - Requires manpower to monitor and enforce
 3. **Tradable permits**: Air pollution (EU ETS), tradable fishing permits?
 4. **Legislation**
 5. **Taxation**
 6. **International co-operation/policies**: For resources that are on an international scale (air, atmosphere, ozone layer), eg. Kyoto/Montreal protocol

1.4.5 Threat to sustainability

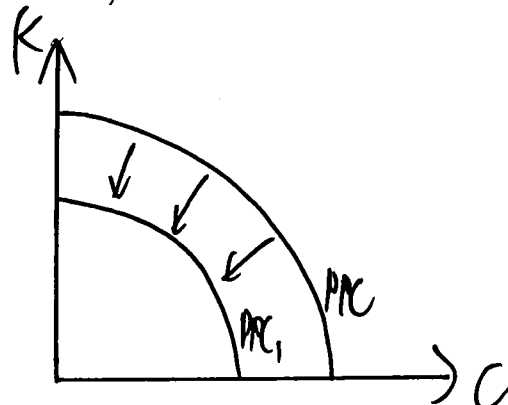
- Use of non-renewable resources/CA resources above Q_{OPT} , ignorance of negative externalities

Reasons for overuse

1. **Richer societies (Pollution of affluence)**
 - Higher incomes, larger consumption & production, more resources used, more pollution and waste
 - Richer (more choices in methods of production), leading to inefficient production
2. **Poorer societies (Pollution of poverty)**
 - **Lack of income, education (knowledge) & proper equipment**
 - For purpose of **subsistence**, exploit CA resources
 - Eg. Use of **slash and burn** techniques to clear forest land for farming
 - Reduces fertility of land, land cannot be used by future generations

Consequences

- Overuse of resources (eg. land, coal)
- Less resources available in future
- Productive capacity decreases (PPC shifts inwards)
- Reduced economic growth



Definition List

1	Market Failure	Failure of the market to achieve efficiency in resource allocation, resulting in the overproduction/ underproduction (OR) over/under allocation of resources , in the absence of government intervention
2	Economic Efficiency	$MPB = MPC$
3	Social efficiency	$MSB = MSC$
4	Marginal Private Benefit	Benefit to consumers for an additional unit of good consumed
5	Marginal Social Benefit	Benefit to society for an additional unit of good consumed
6	Marginal Private Cost	Cost to producers for an additional unit of good produced
7	Marginal Social Cost	Cost to Society for an additional unit of good produced
8	Externalities	3 rd Party costs of production/consumption borne by people not involved in the consumption/production activity
9	External Benefit	3 rd Party benefits experienced by people not involved in consumption of good
10	External Cost	3 rd Party costs experienced by people not involved in production of good
11	Tradable pollution permits	Market set up by government where firms are given permits allowing a certain limit of pollution. If firms want to pollute more, they need to buy permits from less polluting firms.
12	Missing Markets	Non-Provision of a Good
13	Merit Goods	Goods that government encourages consumption may have positive externalities. Government may grant subsidy
14	Demerit Goods	Goods that government discourages consumption may have negative externalities. Government may levy taxes
15	Public Goods	Goods that are non-excludable and non-rivalrous, provided by government (eg national defence)
16	Common Access Resource	Free Goods of nature, not man-made, no opportunity cost in its consumption. Rivalrous, non-excludable & not privately owned
17	Sustainability	Using resources in a way that can satisfy the needs of present generations, without compromising the ability of future generations to meet their needs.