

# Theory of Consumer Behaviour

Unit 3

Lecture: 8 Hrs

# Contents

- Unit 3: Theory of Consumer Behavior 6 Hrs.
- Concept of cardinal and ordinal utility analysis
  - –Cardinal utility analysis: assumptions, consumer's equilibrium, criticisms and derivation of demand curve
- Ordinal utility Analysis: Concept, properties of Indifference curve, marginal rate of substitution, Price Line and consumer's equilibrium,
- Price effect: Derivation of PCC, Income effect: Derivation of ICC, Substitution effect, Decomposition of price effect into income and substitution effect, Derivation of demand curve (**Hicksian approach**)
- (Numerical exercise)

# What does a consumer want ?



Maximum Utility or Satisfaction.  
Can it be measured ?



# Cardinal vs. Ordinal Utility

- The different approach of measuring satisfaction.
- They try to answer:
  - How does a consumer decide to choose a level of commodity to consume ?
  - How does a consumer decide the amount of his income to be spent on various commodities for consumption at given prices or fixed income at different prices?
- The answers can be found using measurement of utility.
  - The types of utilities measurement are cardinal and ordinal utility.



# Cardinal vs. Ordinal Utility

- **Cardinal Utility:**
  - Utility measured in numerical terms.
  - Consumer consumes 3 apples, from 1 to 10 s/he can rank first apple as 10, second as 9, third as 8 and so on.
  - Cardinalists use imaginary unit called utils.
  - Developed by Social Scientist J. Bentham. Later developed and accepted in economic analysis by economists, H.H. Gossen, W.H. Jevons, and L. Walras.
  - Total Utility, Marginal Utility are the concepts from cardinal utility approach.



# Cardinal vs. Ordinal Utility

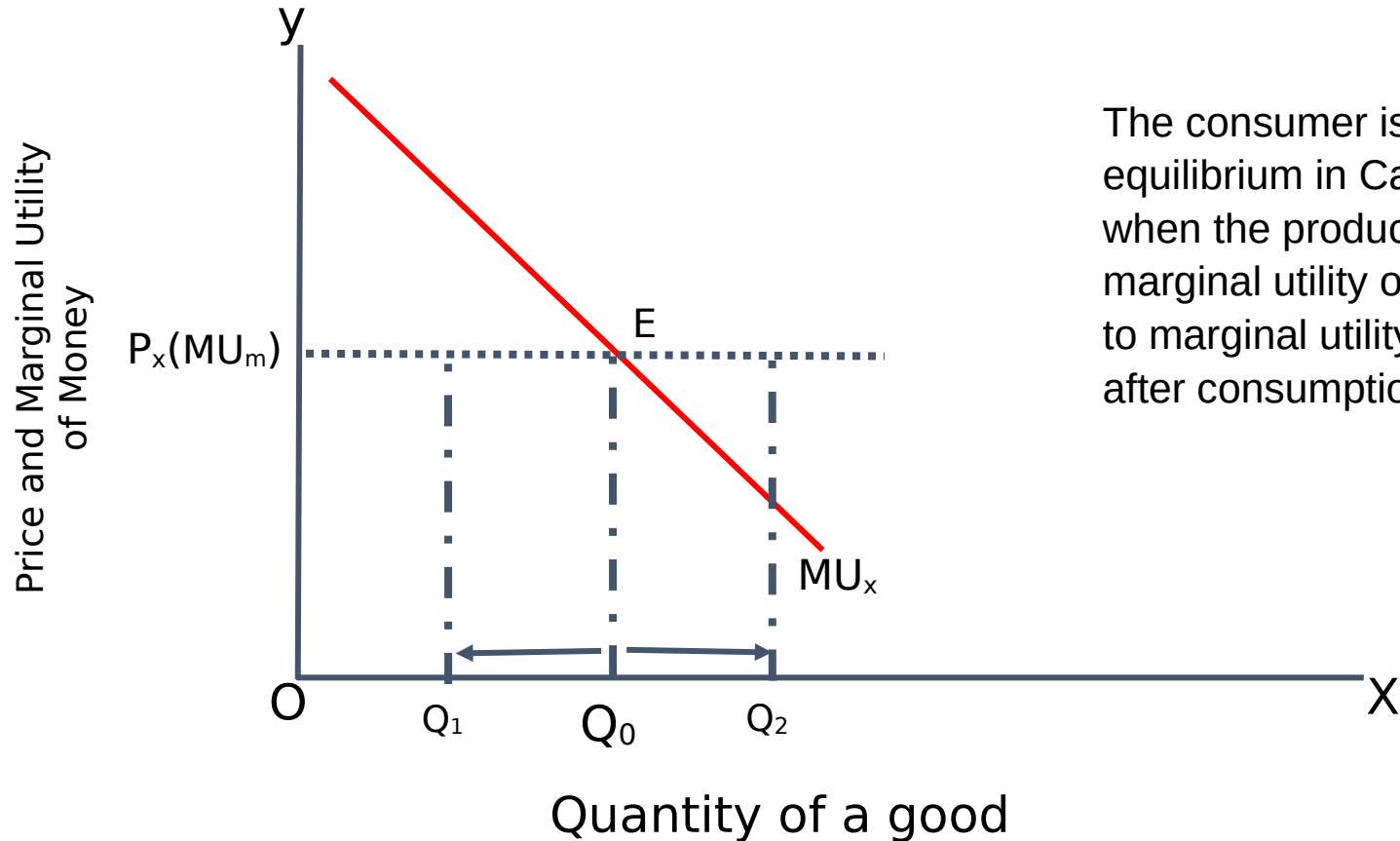
- **Ordinal Utility:**
  - Utility cannot be measured in numerical terms.
  - It can be ranked or put into order.
  - It is a psychological concept and cannot be expressed in number.
  - Example: two consumer drink a glass of apple juice, they cannot say in number and satisfaction may be different for each one.
  - So, under ordinal utility approach consumers need to determine only their preference ranking of bundles of commodities.
  - Indifference curve, marginal rate of substitution are concepts from ordinal utility approach.

# Cardinal vs. Ordinal Utility

Basis of Comparison	Cardinal Utility	Ordinal Utility
Meaning	Cardinal Utility is the utility where the satisfaction derived by consuming a product can be expressed numerically.	Ordinal Utility is the utility where the satisfaction derived by consuming a product cannot be expressed numerically.
Approach	Quantitative	Qualitative
Evaluation	Utils	Ranks
Examination	Marginal Utility Analysis	Indifference Curve Analysis
Promoted By	Traditional and Neo Classical Economist	Modern Economist
Realistic	Less	More

[For details visit the webpage by clicking here](#)

# Consumer Equilibrium using Cardinal Concept



The consumer is said to be in equilibrium in Cardinal Approach when the product of price and marginal utility of money is equal to marginal utility of the good after consumption.



# Cardinal Utility Approach: Assumptions

- **Rationality:** The consumer must be logical, it is assumed. Under the limitations set by his or her degree of money, he or she attempts to maximize utility or level of satisfaction.
- **Cardinal measurement of utility:** Utility is a fundamental idea. It is quantified in the cardinal form using money as the measuring stick, i.e., the utility is determined by the amount of money a consumer is willing to spend on another unit of the good.
- **Diminishing marginal utility:** With each additional unit of a commodity, less utility is gained. The principle of diminishing marginal utility applies here.
- **Budget constraint:** Additionally, it is assumed that the consumer has a finite amount of money to spend on the items and services he selects.
- **The constant marginal utility of money:** No of the level of consumer income, the marginal utility of money remains constant, and the utility of each unit of money is one.
- **Law of diminishing marginal utility:** According to this law, as a customer consumes more and more units of a good or service, the utility derived from each additional unit of that good or service starts to fall, decrease, or decline, yet the overall utility grows at a decreasing pace.
- **Law of substitution:** According to this law, the consumer maximizes his total utility from his available income when he distributes his spending to the purchase of various things in a way that ensures the marginal utility gained from the final unit of cash spent on each item of expenditure tends to be equal.



# Law of Substitution: Cardinal Approach

- This law states that consumer gets maximum total utility by spending his/her given income, when they allocate their expenditure while purchasing different goods in such a way that weighted marginal utility derived from the last unit of money spent on each item of expenditure tends to be equal.
- Assumptions:
  - Two or more goods are taken to be consumed in a given period of time.
  - Consumer spends all of his/her income.
  - Consumer seeks to maximize satisfaction.
  - No control over price of commodity
  - Goods are divisible
  - Wants are comparable, substitutable or complementary.

# Law of Substitution: Cardinal Approach

- Consumer receive maximum satisfaction by using the proportional rule which shows that marginal utilities of selected goods to their price are equal, that is :

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \dots\dots\dots = \frac{MU_n}{P_n} = K$$

- But if he consumes only two goods, X and Y then he reaches equilibrium at point where

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = K$$

**For Table and Figure: Refer to Page number 94 and 95**



# Indifference Curve (IC) Analysis

- **Meaning of IC:**
  - Most commonly used ordinal approach in utility analysis.
  - This curve or graph shows different combinations of two goods or service that provide the same level of total utility or satisfaction to the consumer.
  - It is a locus of consumption of different combinations of two goods that will give the same total utility or satisfaction to a consumer.
  - Here, the utility is not quantified. So, higher indifference curve gives higher satisfaction.



# Indifference Curve (IC) Analysis

- **Assumptions of IC:**

- 1. Rationality of Consumer**

- Consumer is rational as s/he wants to maximize satisfaction.

- 2. Ordinal Utility**

- Consumer ranks his/her preference according to satisfaction of each basket.

- 3. Consistency:**

- If there are two packets A and B of two goods. If in one period consumer prefers A to B, in another period s/he will not choose B over A.

- 4. Transitivity:**

- If there are three goods A, B and C and if a consumer chooses A to B, B to C then A is preferred to C.

- 5. Non-Satiety:**

- Consumer prefers more of goods over less if there is choice available.

- 6. Diminishing marginal rate of substitution:**

- If one good is substituted for other good to keep constant utility, the marginal rate of substitution diminishes.

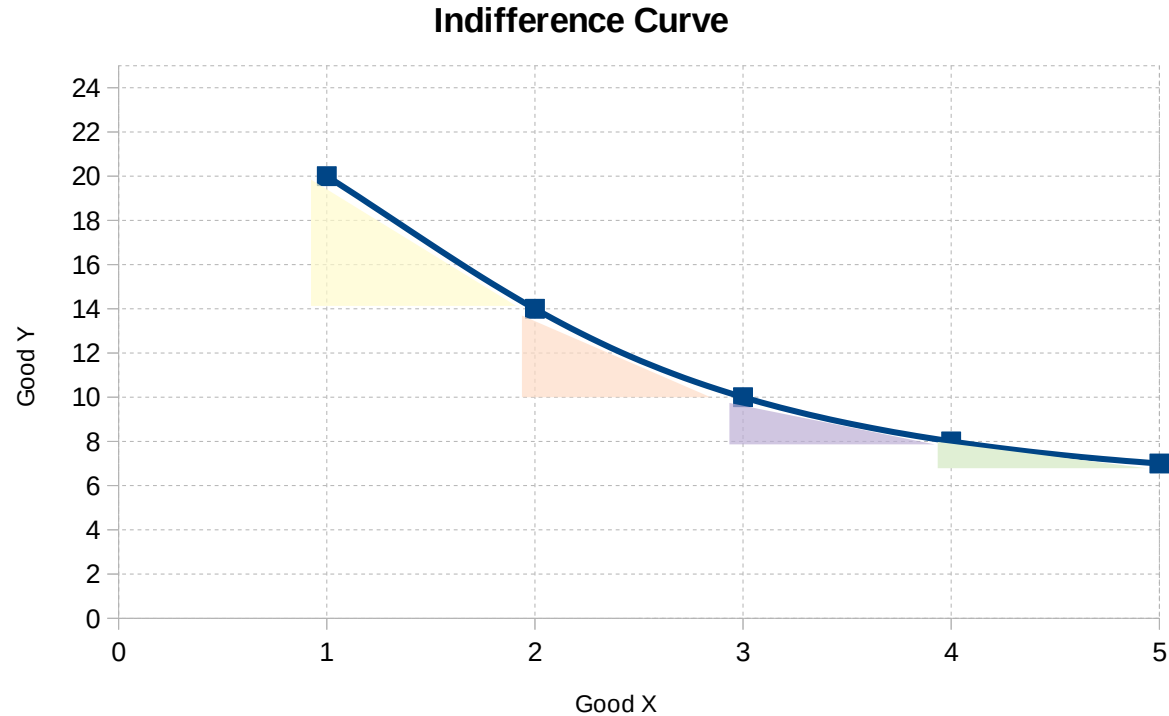
# Indifference Curve (IC) Analysis

- **Marginal Rate of Substitution (MRS):**
  - Maximum amount of good that a consumer is willing to give up in order to obtain one additional unit of another good.
  - Maximum amount of Y consumer will give up to get one more unit of X to maintain constant level of satisfaction.
- **Why does MRS diminish ?**
  - **Particular want is satiable:**
    - The more of a good means the desire for that good decreases. So, a consumer gives up more good of Y to get one unit of X.
  - **Goods are not perfect substitute:**
    - If goods are perfect substitute, increase of one or decrease will not make any difference in significance of goods. In this case, MRS will remain same.
  - **Combinations of two goods are opposite:**
    - Increasing quantity of one good does not increase the need fulfilling power of another Y good.

# Indifference Curve (IC) Analysis

Combination	Good X	Good Y	Constant Utility	Marginal Rate of Substitution
A	1	20	$\bar{U}$	-----
B	2	14	$\bar{U}$	6:1
C	3	10	$\bar{U}$	4:1
D	4	8	$\bar{U}$	2:1
E	5	7	$\bar{U}$	1:1

# Indifference Curve (IC) Analysis

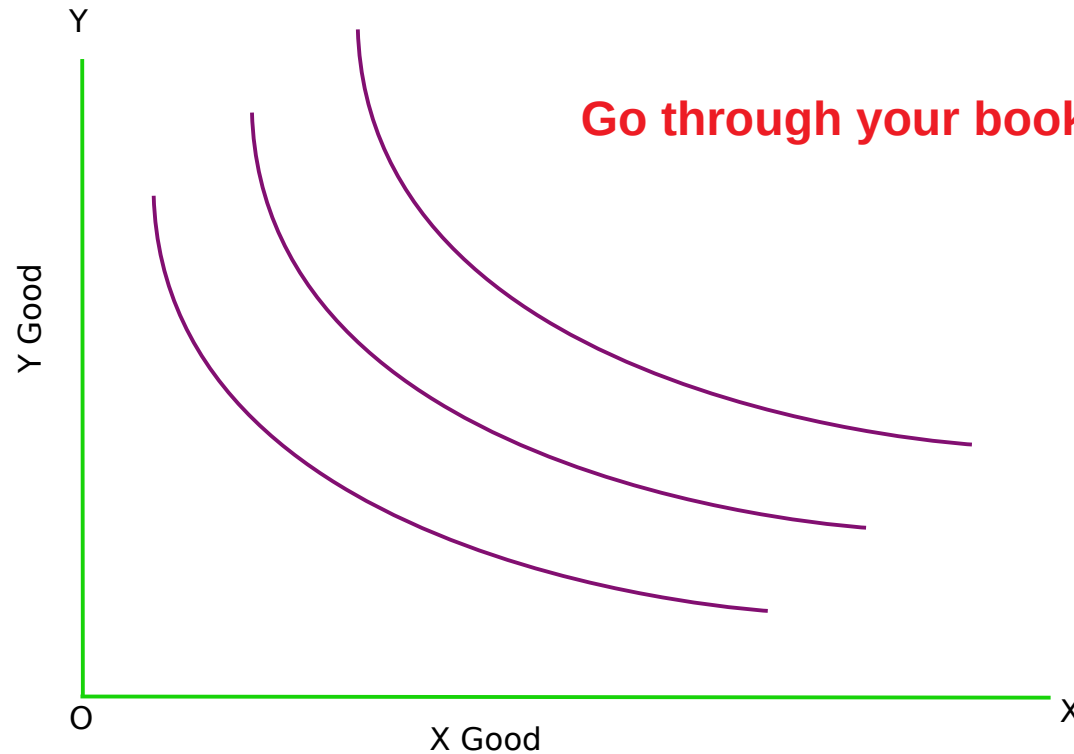




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# Properties of Indifference Curve



# Principle of Diminishing MRS

Let us suppose that consumer consumes only two goods X and Y and they are substitutable imperfectly .

So, Utility function will be

$$U=f(x,y).....(i)$$

Let us suppose consumer substitutes X for Y such that his total utility remains the same .

When s/he sacrifices some units of Y goods , total utility will change as :

$$MU_y = \Delta TU_y - \Delta Y$$

$$\rightarrow \Delta TU_y = -\Delta Y \cdot MU_y.....(i)$$

Similarly when s/he increases some units of X goods , total utility will change as :

$$MU_x = \frac{\Delta TU_x}{+\Delta X}$$

$$\rightarrow \Delta TU_x = +\Delta X \cdot MU_x.....(ii)$$

Since total utility transferred remains the same so ,

$$\Delta TU_x = \Delta TU_y$$

Substituting the value we get ,

$$-\Delta Y \cdot MU_y = +\Delta X \cdot MU_x$$

$$\rightarrow \frac{-\Delta Y}{\Delta X} = \frac{MU_x}{MU_y}$$

# Budget Line

- Consumer want to reach highest possible indifference curve to achieve highest level of satisfaction given the limited income.
- Budget line is a constraint representing various combination of two goods that can be purchased by fixed income at a given prices.
- Assumption: consumer has fixed income and entire income is spent on two goods.

$$P_x \cdot Q_x + P_y \cdot Q_y = B \text{ (Consumer's budget of income).....(i)}$$

# Budget Line

Equation (i) shows that consumer given his/her income at constant prices of X and Y can purchase only limited quantity of two goods.

From Equation (I) we can write:

$$Q_x = \frac{B}{P_x} - \frac{P_y}{P_x} Q_y \dots\dots (ii)$$

$$Q_y = \frac{B}{P_y} - \frac{P_x}{P_y} Q_x \dots\dots (iii)$$

*If a consumer spends entire budget on X i.e.  $Q_y = 0$  then*

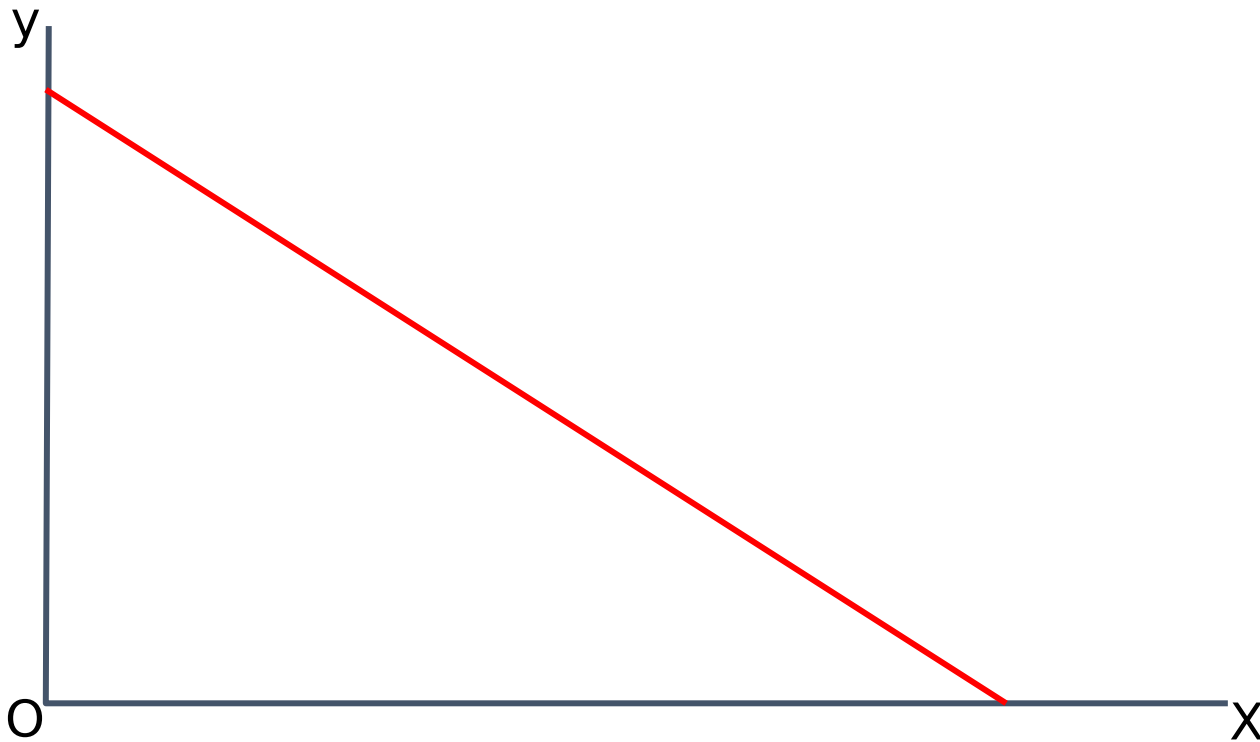
$$Q_x = \frac{B}{P_x}$$

*If entire budget is spent on Y i.e.  $Q_x = 0$  then*

$$Q_y = \frac{B}{P_y}$$

# Budget Line

- Example:
  - Consumer income = Rs. 800 and prices of X and Y are Rs. 40 and Rs. 20 respectively.

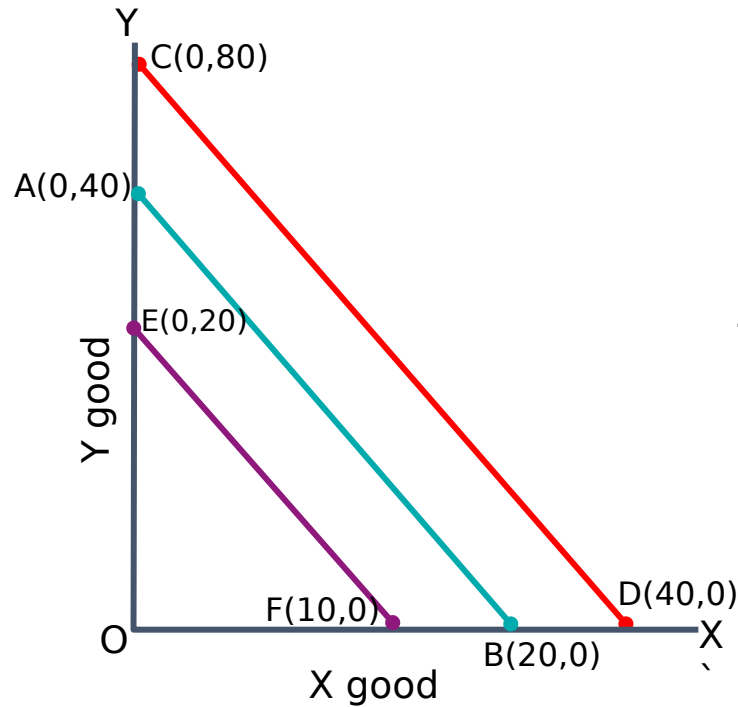




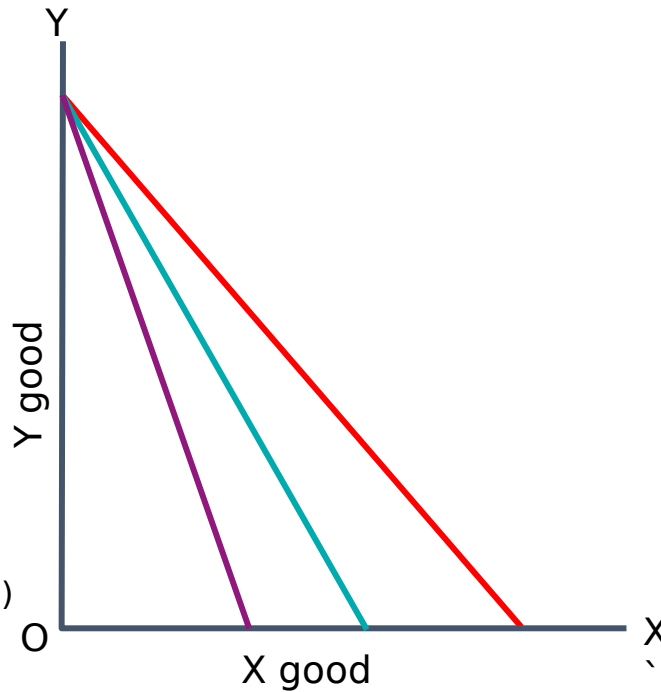
# Budget Line

- Shows purchasing power of the consumer.
- Any combination lying inside a budget line are attainable but not desirable.
- Any combination lying outside budget line are unattainable or beyond capacity of consumer.
- Slope of budget line is negative.

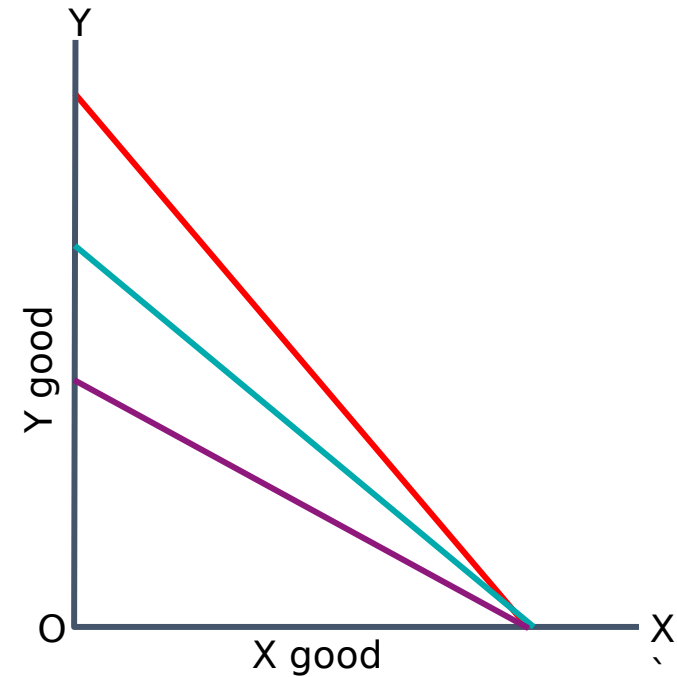
# Shifts in Budget Line



*Fig (i)*



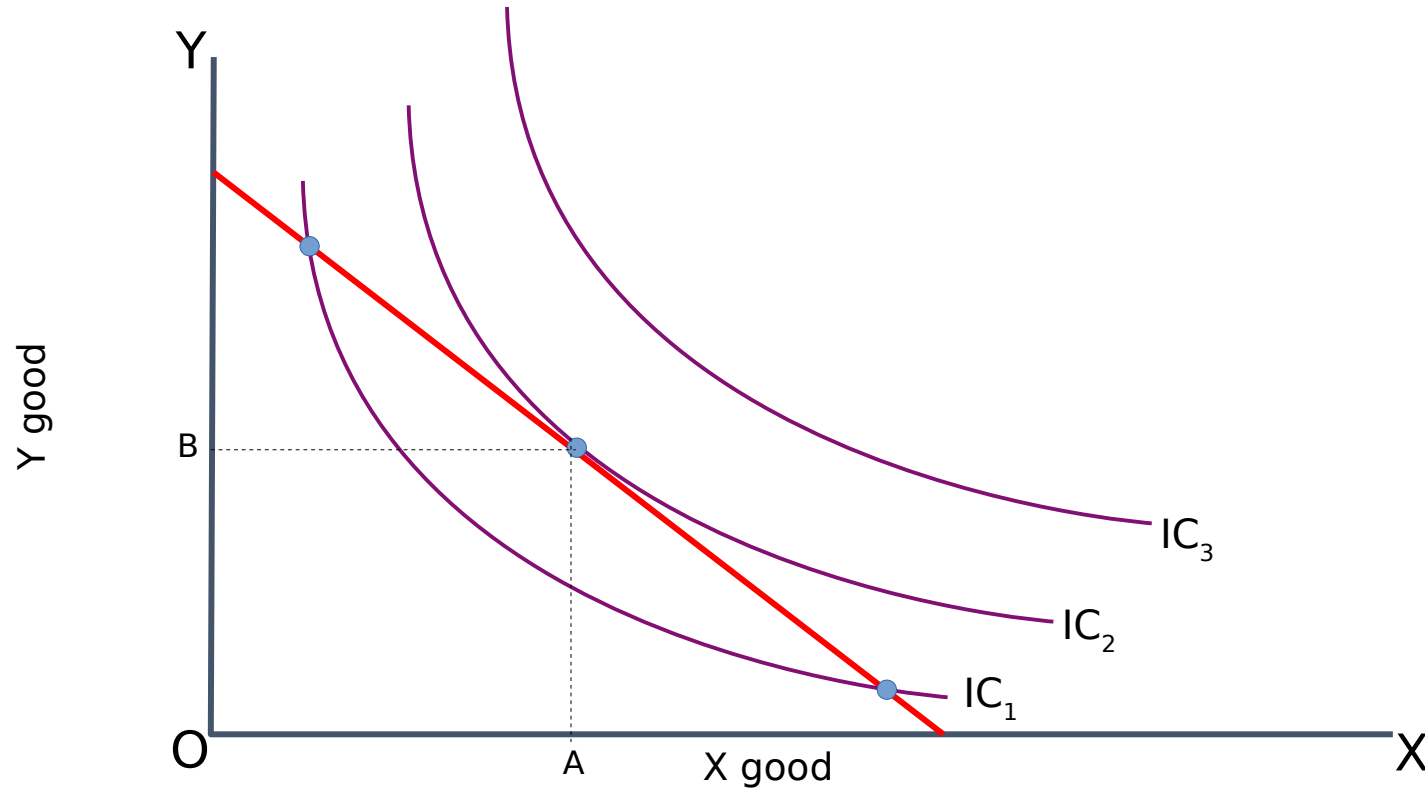
*Fig (ii)*



*Fig (iii)*



# Consumer's Equilibrium



# Consumer's Equilibrium

*Necessary condition :*

*At the point of tangency , Slope of IC = Slope of Budget line*

$$\text{Slope of IC} = \frac{Y}{X} = MRS_{xy} = \frac{-MU_x}{MU_y}$$

$$\text{Slope of budget line} = \frac{-P_x}{P_y}$$

*Then we have ,*

$$\frac{-P_x}{P_y} = \frac{MU_x}{MU_y}$$

$$\rightarrow \frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$

$$\rightarrow \frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

*Sufficient Condition :*

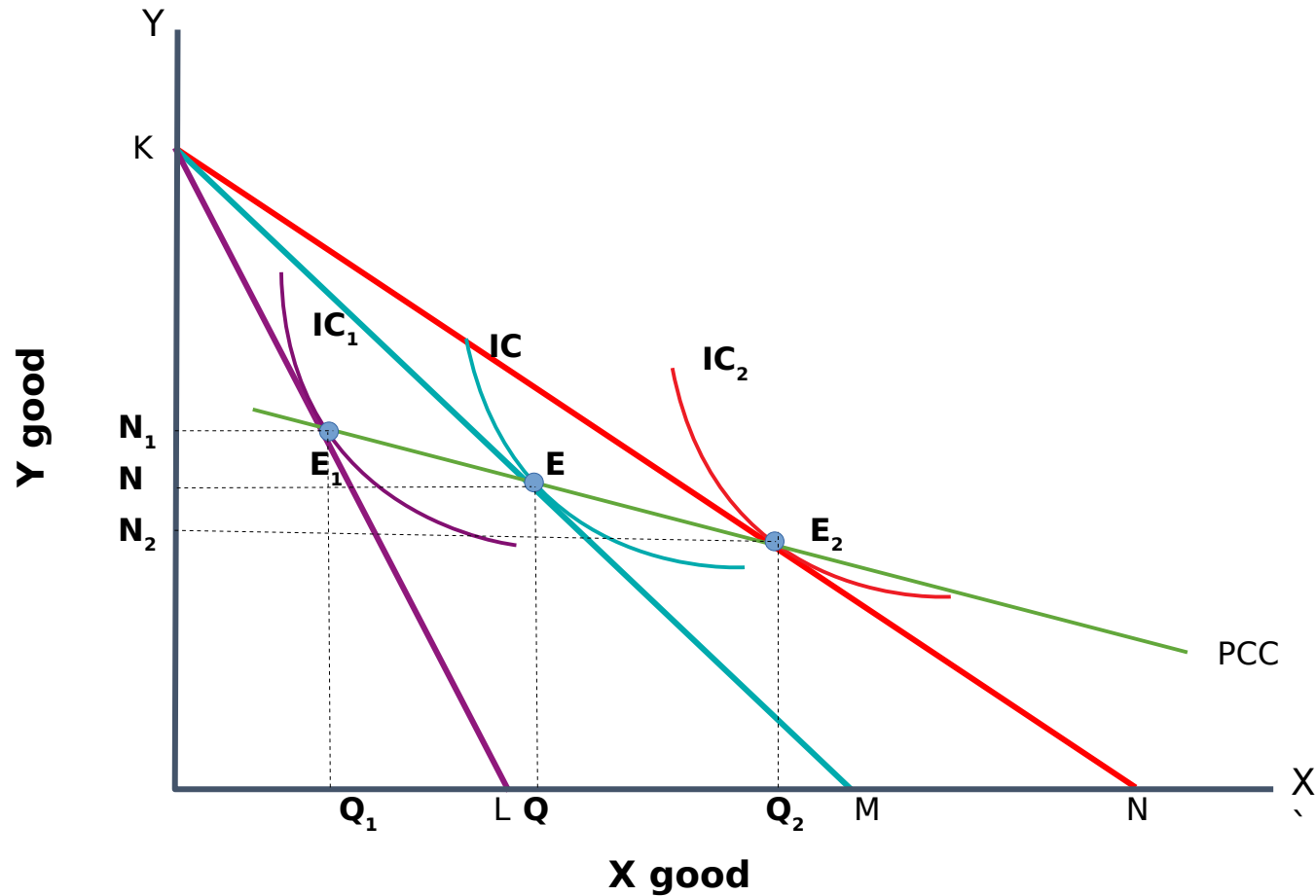
*Indifference curve should be convex to the origin .*

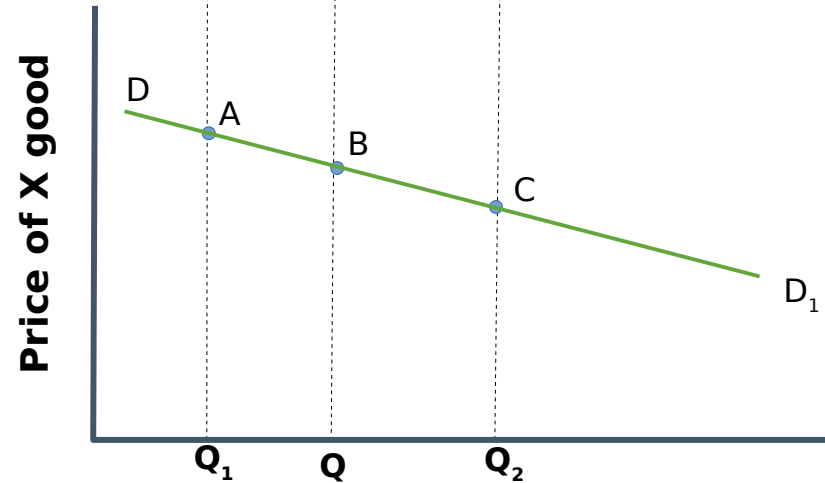
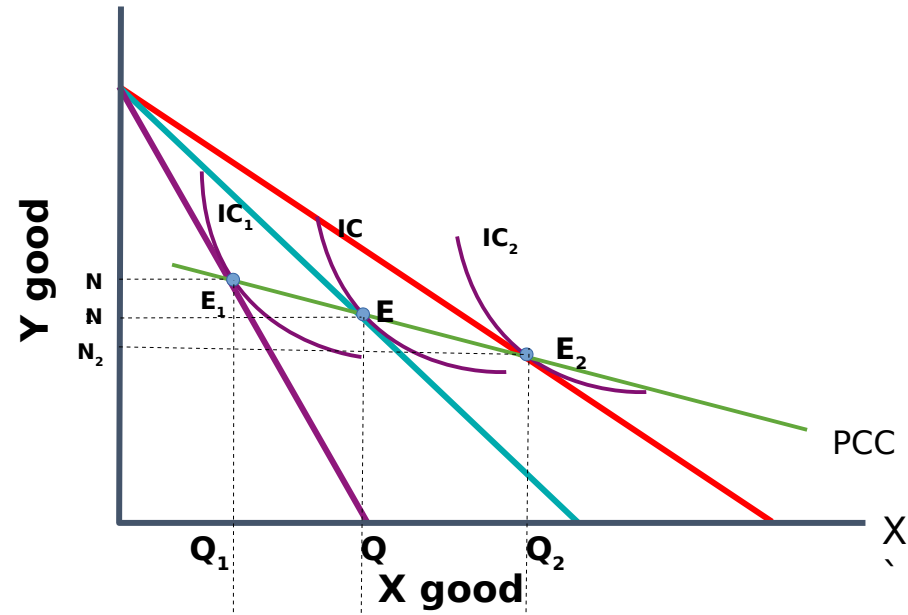


# Price Effect

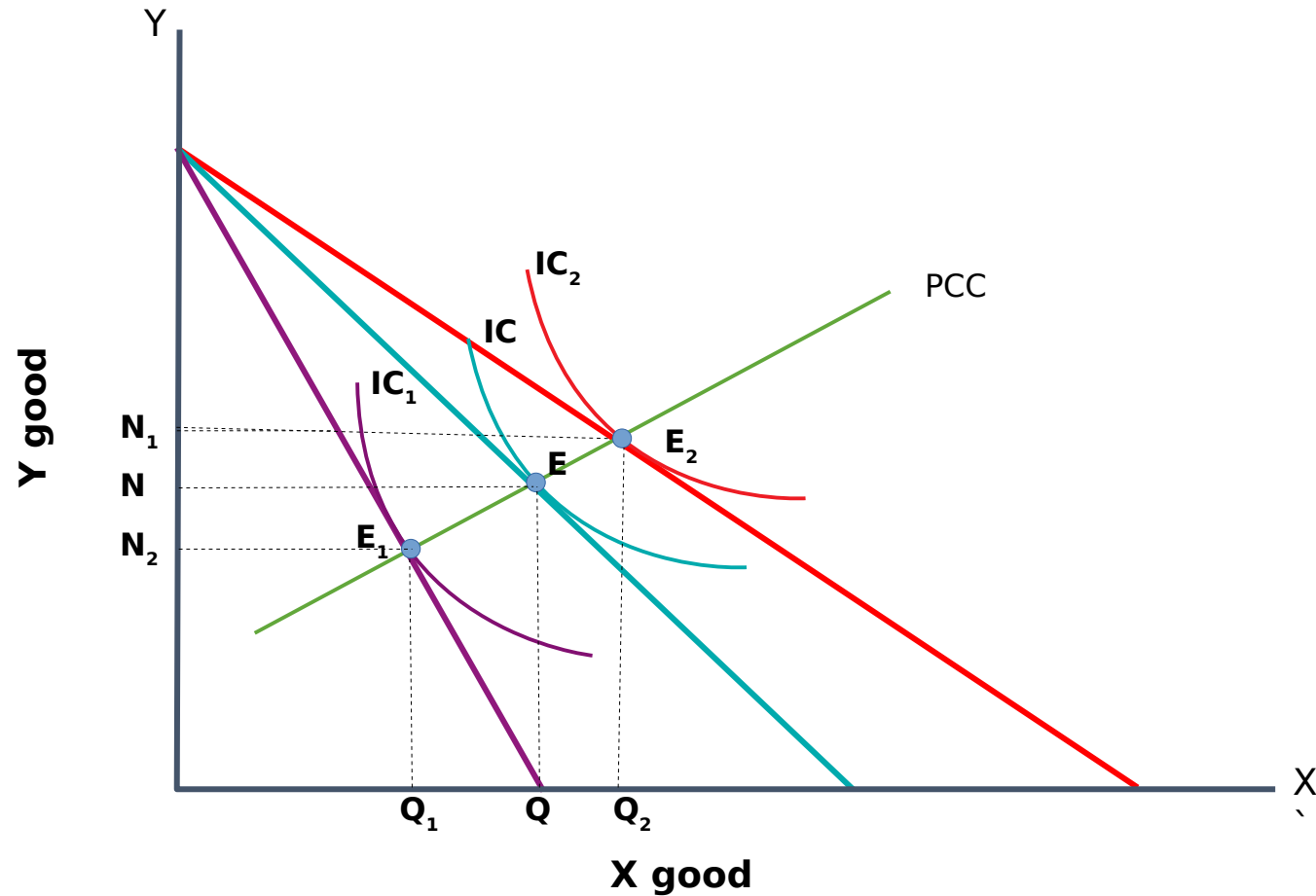
- Shows the total effect on consumer's demand for a commodity due to change in price of same commodity, other things being equal.
- When price changes a consumer will be better off or worse off than before depending upon rise or fall.
- If price falls, equilibrium will be at higher indifference curve and if price rises, equilibrium will be at lower IC.

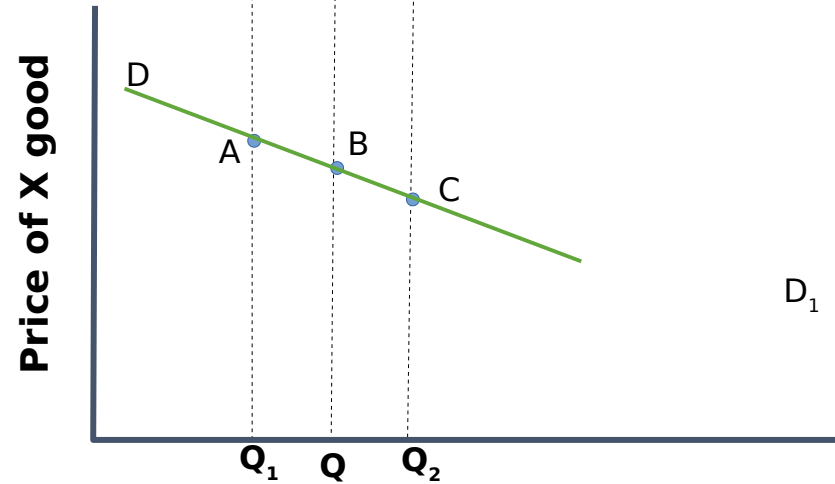
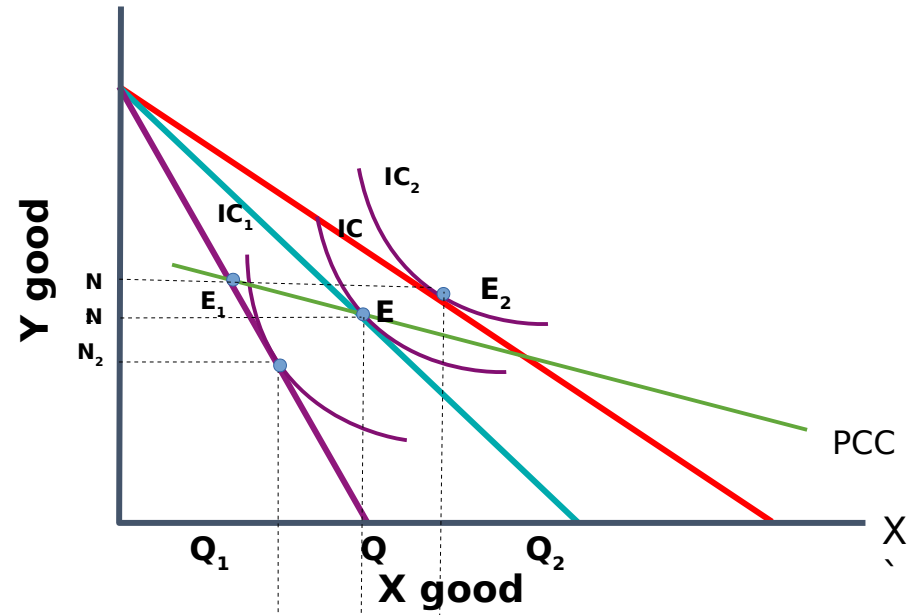
# Price Effect - Substitute Goods





# Price Effect - Complementary Goods





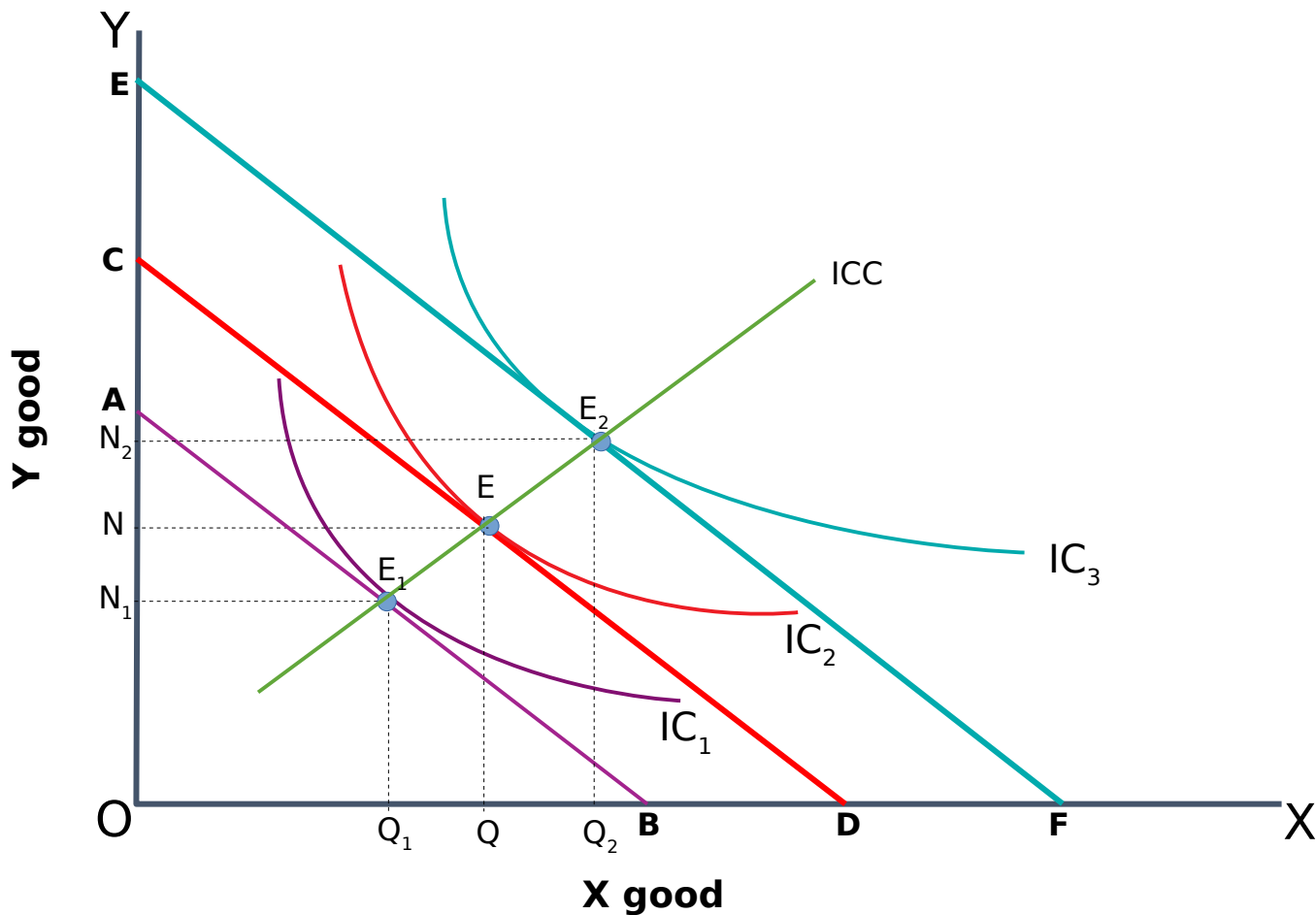


# Income Effect and Engel Curve

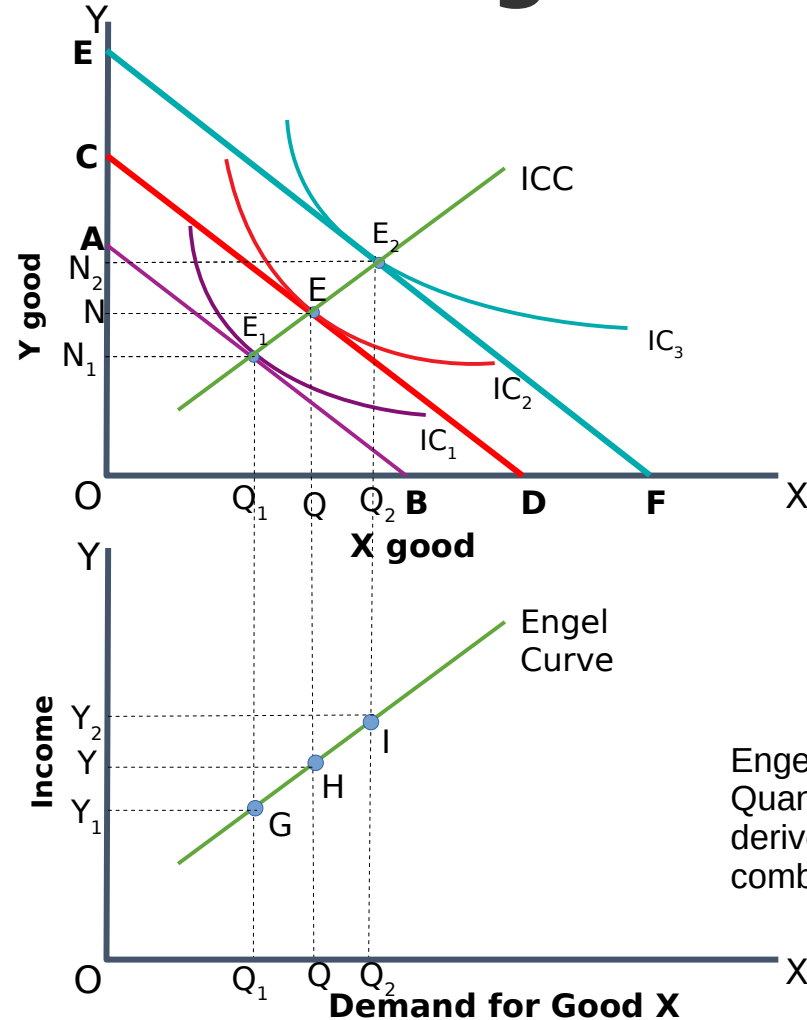
- Shows the total effect on consumer's demand for a commodity due to change in income of the consumer, other things being equal.
- When income changes a consumer will be better off or worse off than before depending upon rise or fall.
- Positive Income Effect:
  - Total effect on demand of normal goods due to change in income of the consumer, other things being equal.



# Positive Income Effect, Normal Goods

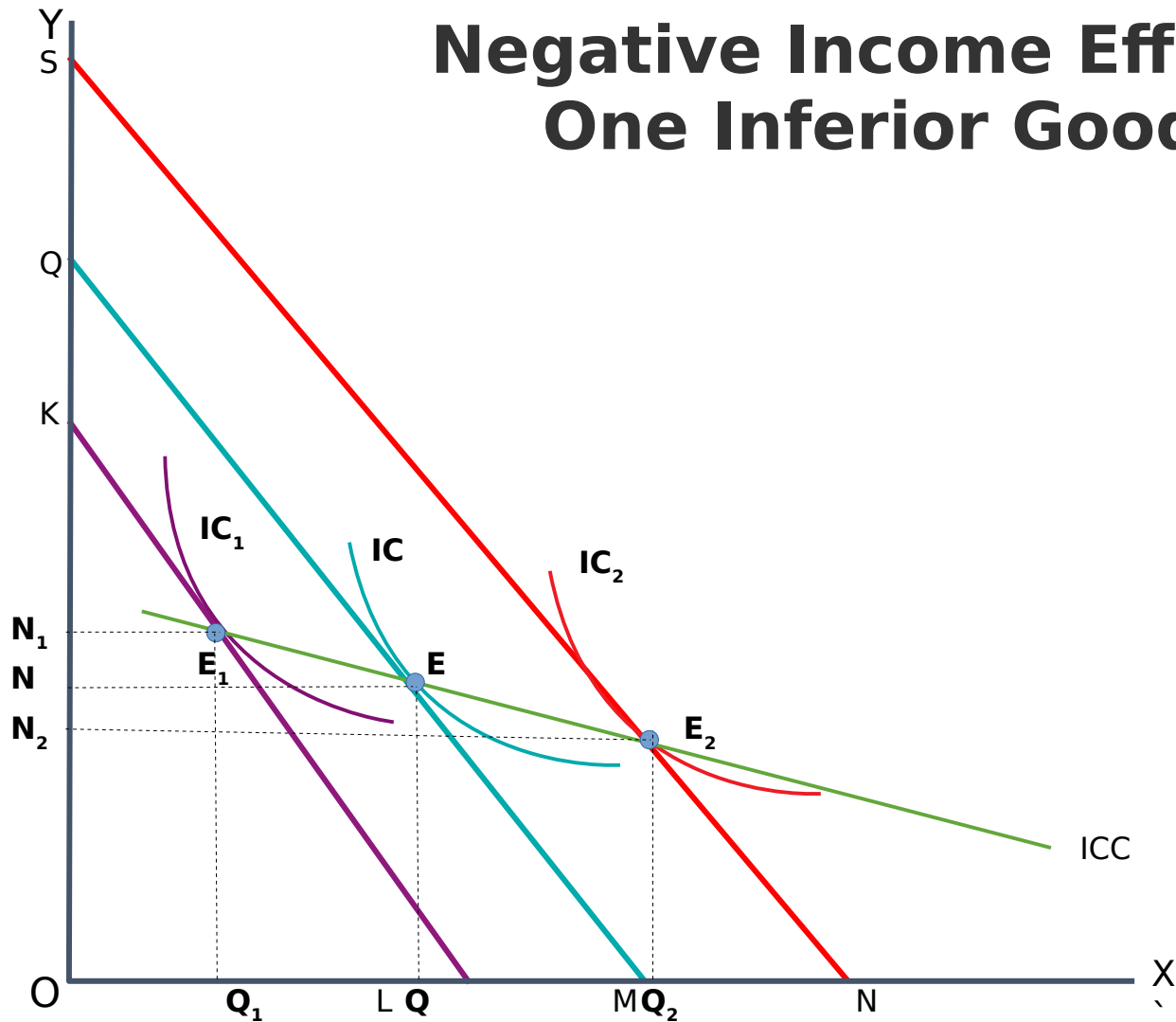


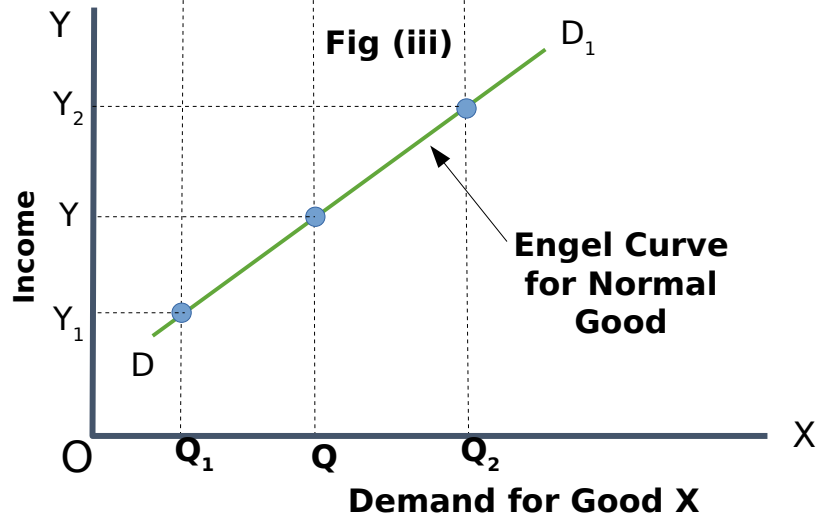
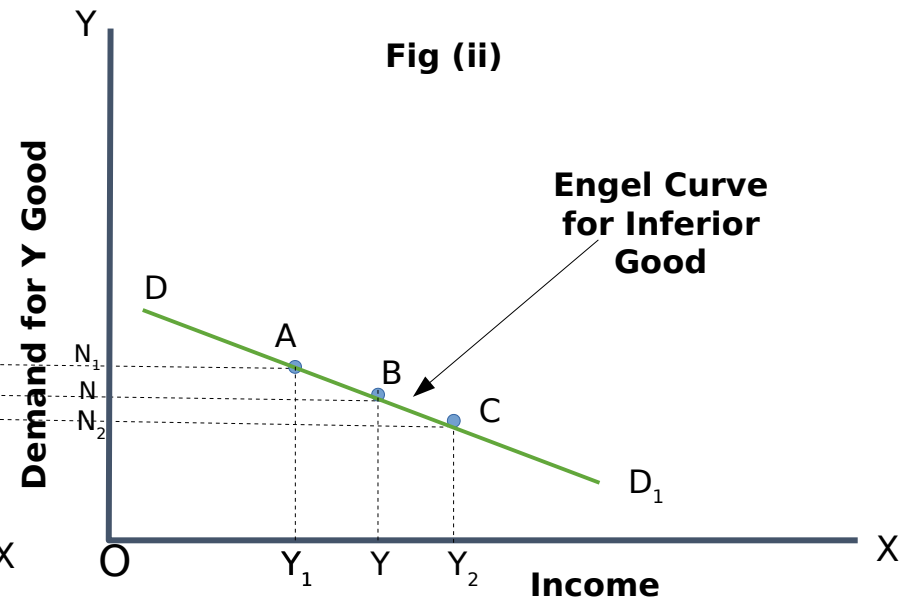
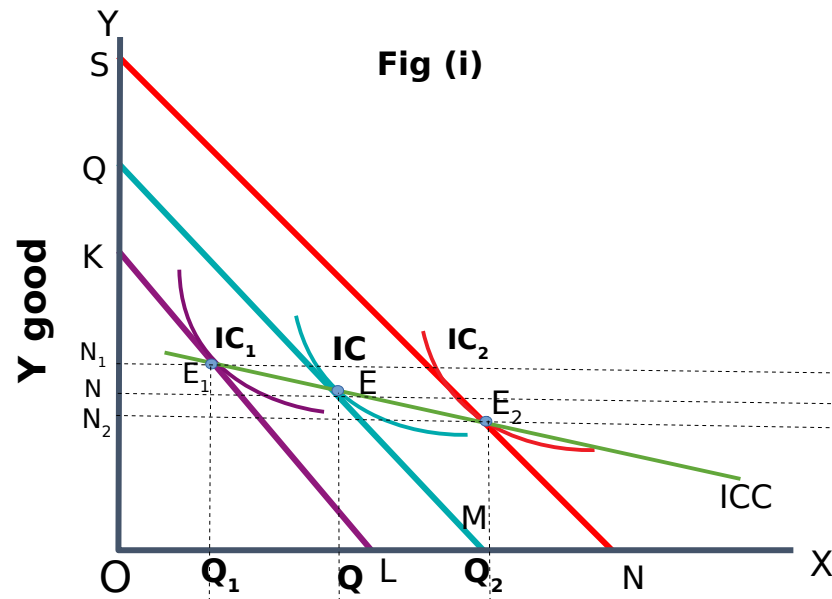
# Income Effect and Engel Curve



Engel Curve is the representation of Quantity demanded at various level of income derived from change in consumption of combination of goods due to change in income.

# Negative Income Effect, One Inferior Good



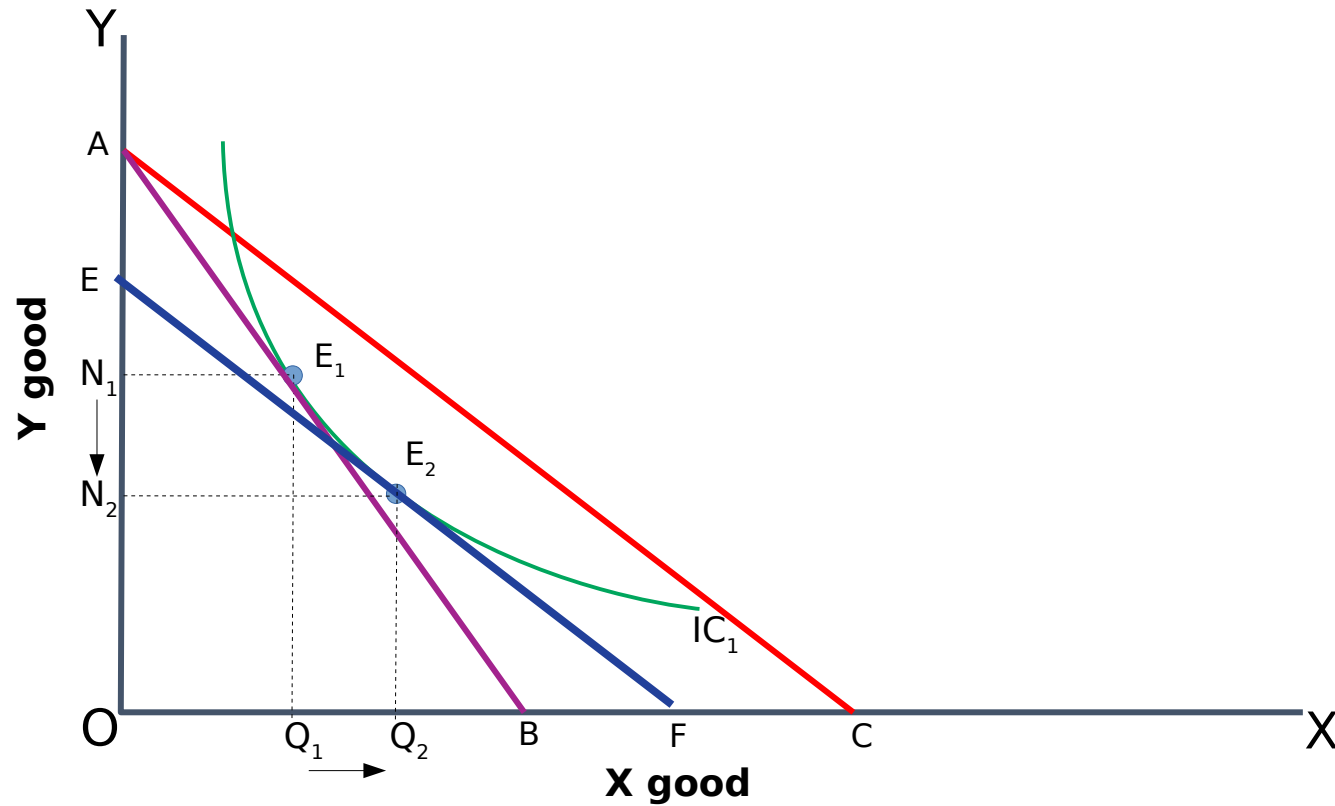




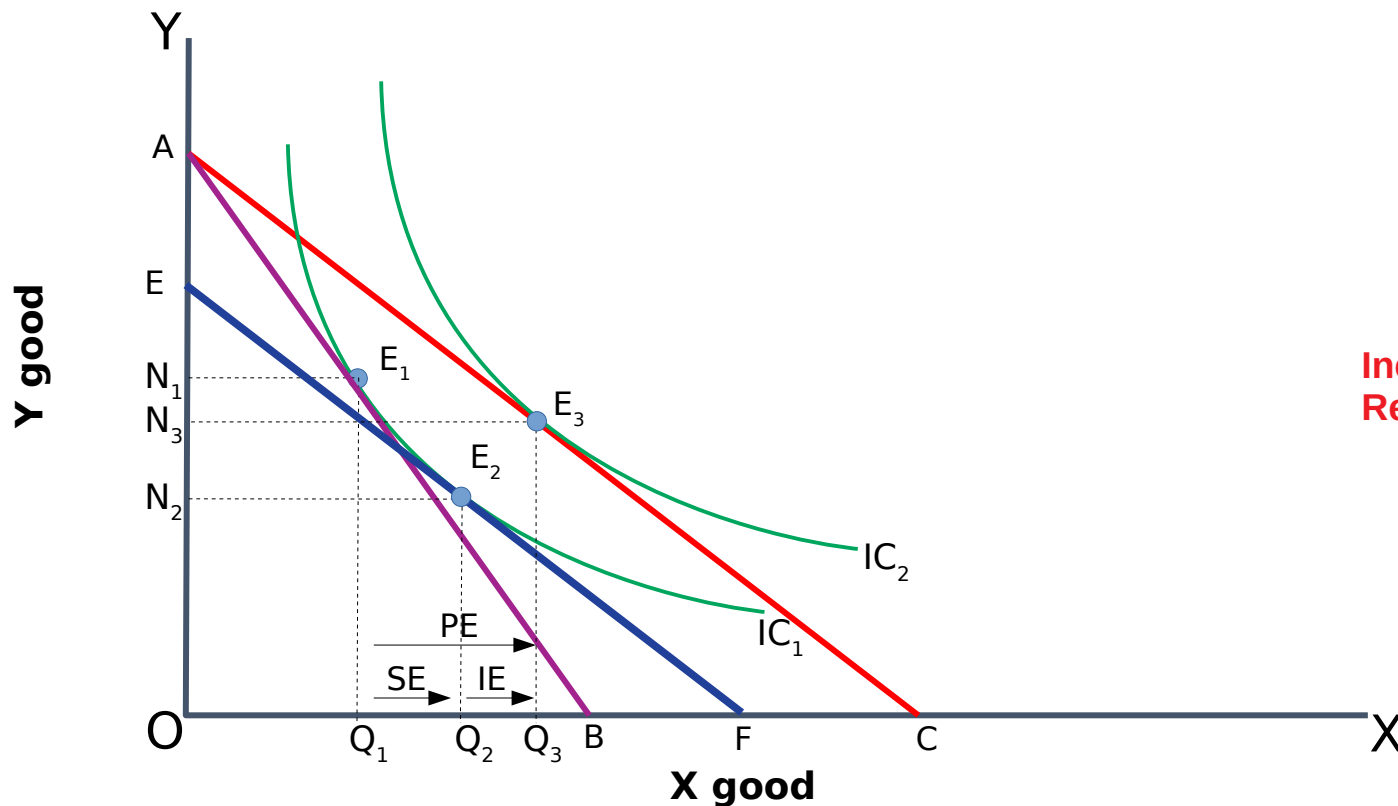
# Substitution Effect

- Change in relative prices of goods makes consumer to substitute to relatively cheaper commodity than expensive one.
- Consumer rearranges the purchases due to change in price of goods while his income remains the same in such a way that satisfaction remains the same.
- When price of a good falls, the real income of consumer rises i.e. purchasing power increases
- But, the consumer can only be satisfied as before by increasing the quantity of purchase good.
- Hence, the satisfaction is compensated at new combination resulting in neither better off or worse off condition.
- This is called substitution effect.

# Substitution Effect

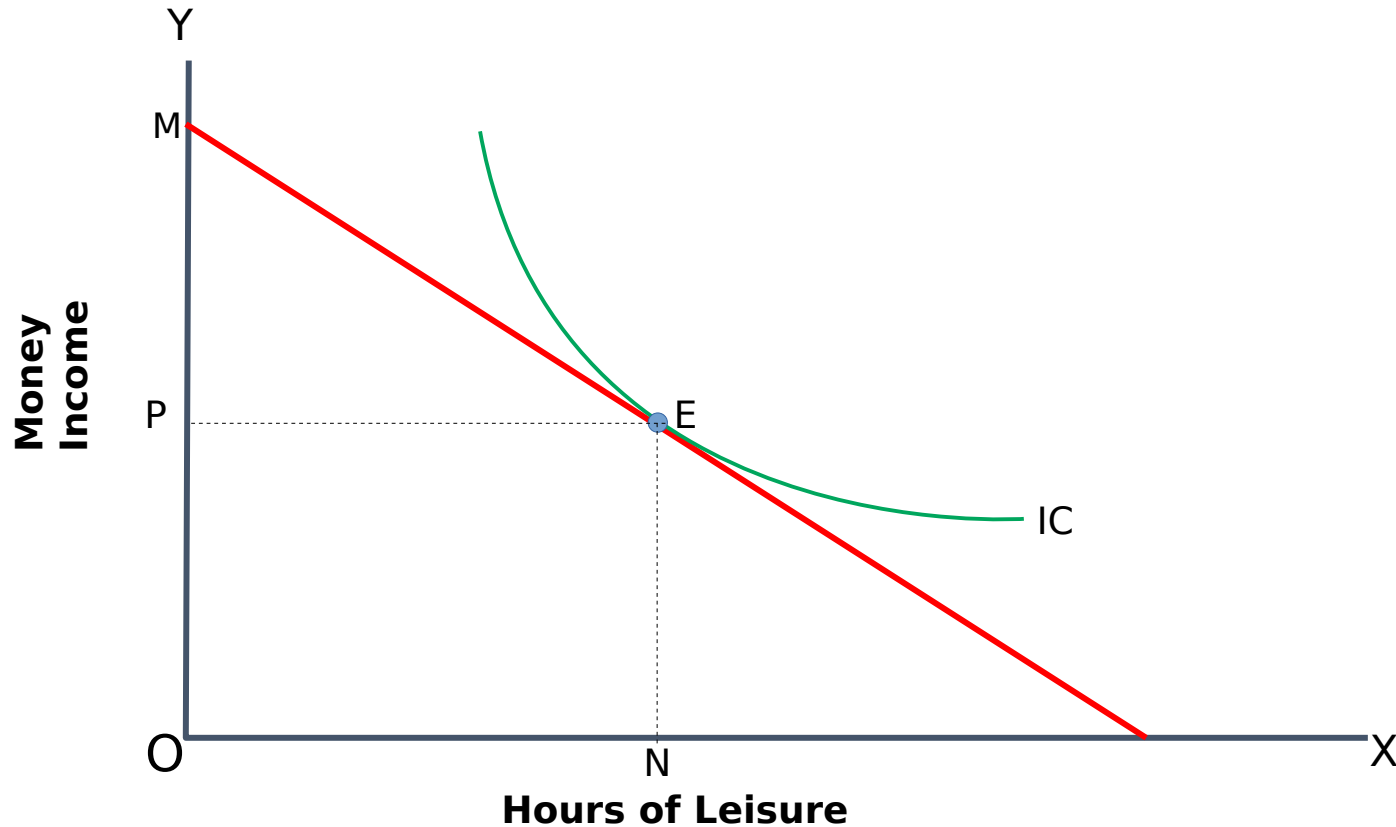


# Decomposition of Price Effect into Income and Substitution Effect



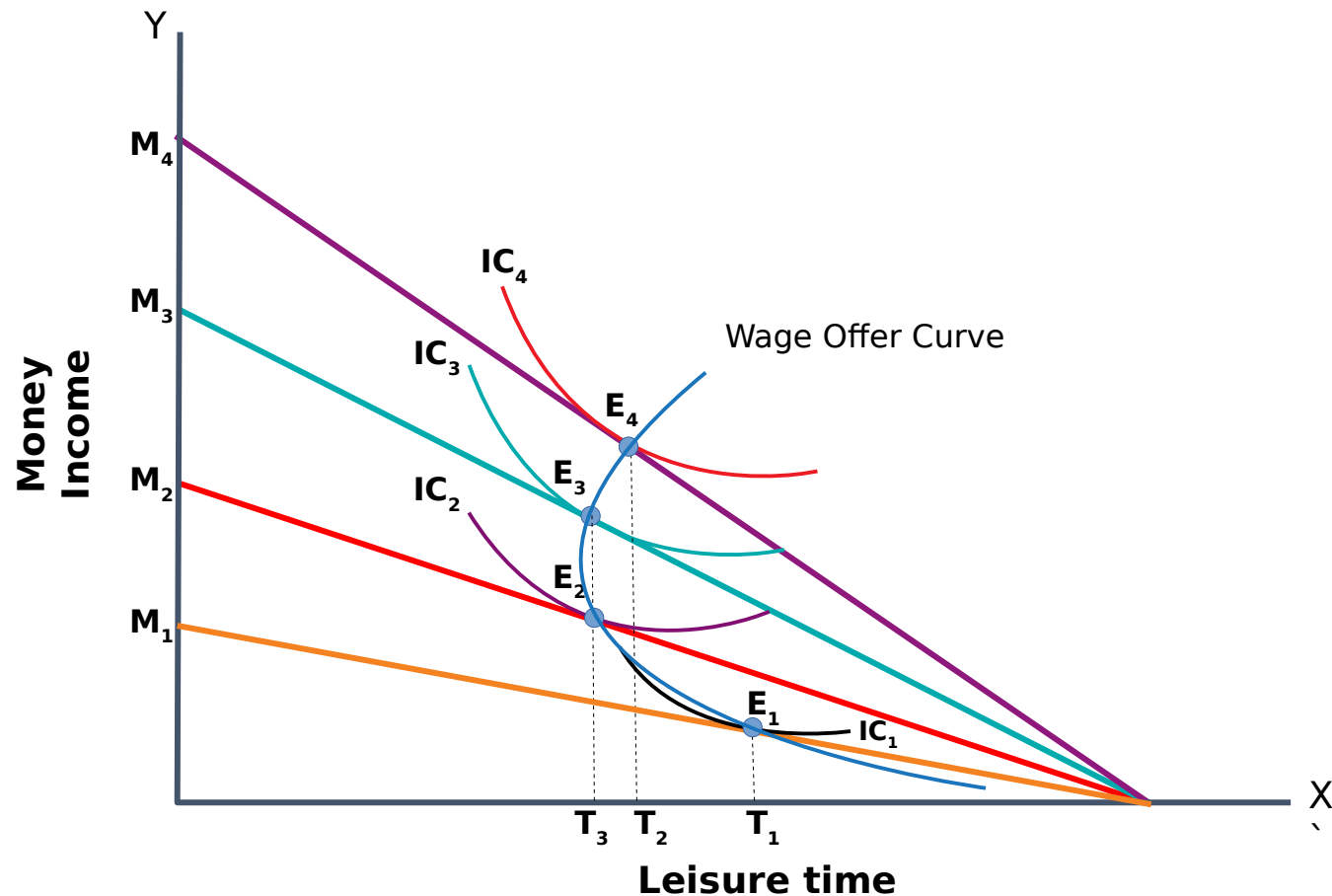
Income tax and Subsidy  
Refer to Classwork!

# Income Leisure Choice of Workers





# Derivation of Wage Offer Curve



# Income and Substitution Effect in Labour Supply

