**Chapter 6**

**Theory of consumer behaviour**

Let us define the topic. Consumer are those people (individuals) who consumes (use) goods and services to satisfy their wants, therefore consumption of goods and services in economics can be divided into two types: 1) monetary sense and 2) real sense. The money sense refers to that part of income which is spent on consumer goods for instance: if monthly income of a person is Rs 10000 and he spent Rs 8000 on clothing, foods etc. The amount Rs 8000 is known as consumption of out of his income. Whereas the real sense, consumption means using utility of goods and services to satisfy human want. For example, the utility one get from the pen i-e by writing, is known as consumption of real sense.

There are two theories that determine the consumer behaviour:

* Marshallian utility approach: Cardinal approach
* Hicksian indifference curve analysis/ Ordinal approach.

**Difference between cardinal measurement and ordinal measurement of utility**

|  |  |
| --- | --- |
| **Cardinal utility approach** | **Ordinal utility approach** |
| Cardinal utility determines the satisfaction level after consuming goods and services , one believes that it is measurable. One can express his or her satisfaction in cardinal numbers i.e., the quantitative numbers such as 1, 2, 3, and so on. | In this approach, one believes that it is comparable. One can express his or her satisfaction in ranking. One can compare commodities and give them certain ranks like first, second, tenth, etc. |
| In cardinal approach, utility can be measured in utils | It shows the order of preference. An ordinal approach is a qualitative approach to measuring a utility. |
| In the real world, one cannot always measure utility. | Utility is ranked on the basis of level of satisfaction. It is more practical and sensible. |
| In this approach, One cannot add different types of satisfaction from different goods | It assumes that there are only two goods or two baskets of goods. It is not always true |
| Mr A consume a pizza which gives him 80 utils of satisfaction whereas burger gives only 20 utils. | Mr A, gets more satisfaction from Pizza as compare to the burger. |
| This theory was proposed by Prof. Marshall | This theory was proposed by Prof. J R Hicks |

**Theory of consumer behaviour-1**

**Utility approach**

According to Cardinal utility approach, Individuals have a limited income (budget) to be spent on goods selected by him/her for consumption. Therefore, in such a case when there is an objective of utility maximization within limited budget, he/she choose those goods and services whose consumption is unavoidable.

Utility is the want-satisfying power of any good or service; the satisfaction or happiness a consumer obtains from the consumption of a good or service. Utility is basically of seven types

1. **Initial utility:**

Initial utility is the amount of utility which we obtain from very first unit of consumption.

1. **Marginal** **utility**

It is the additional satisfaction gained from one extra unit of consumption. It decreases with each additional increase in the consumption of a commodity.

Marginal Utility (M.U.) = Change in Total Utility / Change in Total Quantity

Or, MU = Δ TU/ Δ Q

1. **Positive utility:**

Positive utility is the amount of utility that gives positive satisfaction.

1. **Satiety:**

When the marginal utility is zero and total utility is maximum, that is known saturation point or point of satiety.

1. **Negative utility;**

Utility that gives negative satisfaction. it happens when consume more than necessary leading to a further decrease in marginal utility. It is also known as disutility.

1. **Total** **utility**

Total utility is the sum of the total satisfaction from the consumption of specific goods or services. It increases as more goods are consumed.

Total Utility (T.U.) = U1 + U2 + … + Un

1. **Average** **Utility**

One can obtain it by dividing the total unit of consumption by the number of total units. Suppose there are total n units, then

Average Utility (A.U.) = T.U. / Number of units = T.U. / n

**Law of diminishing marginal utility:**

The Law of Diminishing Marginal Utility states that by keeping all other factors constant, as consumption increases the marginal utility derived from each additional unit decreases. Marginal utility can be obtained as the change in utility when an additional unit is consumed. Utility is an economic term used to represent level of satisfaction or happiness. Marginal utility is the incremental increase in total utility that results from consumption of one additional unit of a commodity.

It can be define as:

“The additional or extra benefit which a consumer derives from his limited income of his stock of commodity decreases with every increase in stock (unit of a commodity) that he already has”

In other words, the Law of diminishing marginal utility explains that as a consumer consumes any good, the level of satisfaction or utility that they derive from that product wanes as they consume more and more of that good.

For instance, a consumer might buy a certain type of candies for a while. Soon, he/she may purchase less and choose another type of candies or buy chocolates instead because the level of satisfaction they were initially getting from the candies is diminishing.

For understanding it more clearly we can take another example, Mr A purchase a slice of pizza for Rs 90; he is hungry and decides to buy five slices of pizza. After doing so, the consumer consumes the first slice of pizza and gets certain positive utility from eating the first slice. Because the Mr A was hungry and this is the first slice he consumed, and it has high benefit (initial utility). By eating the second slice of pizza, the consumer’s appetite is becoming satisfied. He wasn't as hungry as before, thus the second slice had a smaller benefit as the first. Upon consuming the third slice of pizza, he gets even less utility, as the consumer is not hungry anymore. By consuming the fourth slice, it is difficult to be consumed because then he feels discomfort upon consuming the slice. After that another slice cannot even be consumed. Because the consumer is so full from the first four slices of pizza that eating the last slice of pizza results in negative utility or disutility. The fifth slice explains the decreasing utility that is experienced upon the consumption of any good continuously.

Law of diminishing marginal utility applies to all kinds of consumer goods, such as durable and non-durable goods.

Let us now learn the law of diminishing marginal utility with the help of numeric example. Assume that a consumer only consumes good X (i-e slices of Pizza).

**Table-1 shows the total and marginal utility schedules for Pizza:**

|  |  |  |
| --- | --- | --- |
| **Slice of pizza(units of good X)** | **T.U** | **M.U** |
| 1 | 20 | - |
| 2 | 32 | 12 |
| 3 | 40 | 8 |
| 4 | 40 | 0 |
| 5 | 38 | -2 |

This table demonstrate that when a consumer consumes 1 unit of commodity x i-e slice of pizza. Total Utility is increases as number of units consumed are increased till the fourth slice of pizza is consumed. At the fourth slice, Total Utility has achieved its maximum level of 40. Beyond this level, an extra slice of pizza is consumed yields negative satisfaction or disutility for the consumer that result in decrease in total utility.

According to the law of diminishing marginal utility, the table indicates a decreasing trend as more and more units are consumed. Therefore the question arises in our mind, why MU diminishes. This is just because of the fact that the total utility which is obtained from the consumption of any good, depends on the need of the consumer for that good.

Moreover, the intensity of the need reduces as an individual consumes more and more of a product. If any additional units of a commodity give less satisfaction, thus the individual would not be ready to pay a price for each unit consumed. In some case, the individual would be willing to pay the lowest price for those extra units of goods as there is a decline in the utility.

**Assumptions of the Law of Diminishing Marginal Utility:**

Following are some assumptions of the law:

1. **Cardinal measurement of utility:**

Under Law of diminishing marginal utility it is assumed that the level of consumer satisfaction can be measured in quantitative numbers such as 1,2,3 so on.

1. **Standard unit:**

It is assumed under the law that there must be a standard unit of a consumer good. In other words it can be said that the reasonable quantity of product is consumed. For example, If a hungry person is given pizza in a bite, then every additional spoon will give him more utility. Thus, to hold the law true, proper and suitable quantity of a product should be consumed.

1. **Continuous consumption of a commodity:**

This law implies that the consumption of a commodity must be continuous; there should be no gap (time interval) in the consumption of units of a commodity

#### No change in Quality:

Quality of the product that consumer consumes at that time is assumed to be uniform. For example, A second slice of pizza with chicken and cheese topping may give more satisfaction than the first one, if the first slice of pizza was with vegetable topping.

#### Rationality:

The consumer is assumed to be rational whose behaviour and taste, preference must be same during the consumption period.

**Law of Equi-Marginal Utility:**

There is one drawback in the above law. Law of diminishing marginal utility implies the behaviour of the consumer regarding a specific good over a period of time. It does not state the behaviour of a consumer as a whole. So, the law of Equi-marginal utility was introduced with the extension of the law of diminishing marginal utility. This law determines the maximizing total utility. Moreover this law does not represent that rational consumer substitute one good for another in order to maximize his utility, For example, coke and pepsi. It simply explains that a consumer demand different commodities (more than one) within his purchasing power and derives maximum level of satisfaction from them. This is what every normal individual desires. This law is also called, The Law of substitution or the Law of Maxi­mum Satisfaction. Thus the law of equi-marginal utility is defined as:

“ How a consumer maximises his total utility by equalising the marginal utility per rupee of each of the products that he purchases from the market”

**Explanation of the Law:**

Suppose that consumer have 60 rupees, and there are two commodities ice-cream and chocolate. The individual is rational, he will try to spend these 60 rupees on these two goods to maximise his total utility, and that is the point where consumer will be in equilibrium. Moreover, As we know that utility can be measured in utils or cardinal approach (e.g 1,2 ,3 and so on).

The law of equi-marginal utility explains that the consumer will be in equilibrium position at that point where the utility derived from the last rupee spent on each good is equal. This can be stated in the form of equation as:

Consumer equilibrium (Ce) =

Here

MUx is the marginal utility of commodity X, i-e ice-cream

Px is the price of good X (ice-cream)

Muy is the marginal utility of commodity Y, i-e chocolate

Py is the price of good Y (chocolate)

MUn is marginal utility of commodity n

Pn is the price of commodity n.

Let us clear the law of equi marginal utility with the help of following Table:

Assuming that consumer has Rs 60, and price per ice-cream (good X) is Rs 10.price per chocolate(good Y) is Rs 5.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Units** | **MUx** | **MUy** | **Mux/Px** | **Muy/Py** |
| 1 | 100 | 35 | 10 | 7 |
| 2 | 90 | 30 | 9 | 6 |
| 3 | 80 | 25 | 8 | 5 |
| 4 | 70 | 20 | 7 | 4 |
| 5 | 60 | 15 | 6 | 3 |
| 6 | 50 | 10 | 5 | 2 |

From the above table, the 1st column represents the units consumed of commodities, the 2nd and 3rd column of that table shows the utilities derives from the consumers consumption of ice-cream (good x) and chocolate (good Y).here we can see that when a consumer consume 1 unit of Ice-cream, he gets the benefit of 100 utils . Whereas by consuming the 1 unit of chocolate, he will benefit 35 utils. After consuming two units of ice-cream he gets the benefit of 90 utils, whereas consuming two units of chocolate gives him satisfaction of 30 utils. Three units of ice-cream give him satisfaction of 80 but consumption of three units of chocolate gives him 25 utils. By consuming four units of both the commodities a consumer gets 70 utils from ice-creams and 20 utils from chocolate. Fifth unit of ice-cream gives the benefit of 60 utils and same unit of chocolate benefits him 15 utils. After that another sixth unit of ice-creams benefits him 50 utils and chocolate gives him 10 utils. Here we can observe that continuous use of two commodities gives less and less satisfaction.

Column 4th and 5th represents that assuming that marginal utility of money is constant i-e 60. The marginal utility of ice-cream for various units can be obtained by dividing its price per unit of ice-cream. Marginal utility for chocolate can be obtained by dividing marginal utility of units consumption divided by its price per unit.

**Case-1:**

We can identify the consumer equilibrium from the above table where MUx/Px=MUy/y, here we can see that when 4 unit of ice-cream give 7 utility and 1 unit of chocolate gives the marginal utility of 7 , we can examine the consumer equilibrium with mathematical formula:

Px.Qx+Py.Qy=M

(Price of ice-cream \* quantity of ice-cream consumed)+(price of chocolate\* quantity of chocolate consumed) must be equal to consumer money income.

(10\*4)+(5\*1)=60

40+5>60

Here we can say that consumer is not in equilibrium because, money income which is spent n on goods is less than his income. In other words, Income of a consumer is not fully utilize.

**Case-2:**

We can see that the consumer equilibrium from the above table where MUx/Px=MUy/y. We can see that when 5 unit of ice-cream give 6 utility and 2 units of chocolate gives the marginal utility of 6 , we can examine the consumer equilibrium as:

Px.Qx+Py.Qy=M

(10\*5)+(5\*2)=60

50+10=60

60=60

This is the point where the consumer is in equilibrium as MUx/Px =MUy/Py. The money income spent on both the consumption gives him equal level of satisfaction and income is spent completely on these two commodities.

**Case- 3:**

To understand it more clearly, we must examine all the values on marginal utility of good x and good y to identify the whether any other consumer equilibrium can be attained from the above table where MUx/Px=MUy/y, here we can see that when 6 unit of ice-cream give 5 utility and 3 unit of chocolate gives the marginal utility of 5 , we can examine the consumer equilibrium with mathematical formula:

Px.Qx+Py.Qy=M

(10\*6)+(5\*3)=60

60+15=60

75=60, or 75>60

Here we can say that, there is no equilibrium of a consumer because the expenditure spent on both the goods is greater than the consumer money income.

**Assumption of the law of equi-marginal utility:**

1. **Price of goods**

Law of equi marginal utility holds when assuming that prices of both the goods remains constants for specific time period.

1. **Income of consumer:**

The law of equi marginal utility implies that income of a consumer remains fixed for some particular time period.

1. **Cardinal measurement of utility:**

Under Law of equi marginal utility it is assumed that the level of consumer satisfaction can be measured in quantitative numbers such as 1,2,3 etc.

1. **Rationality:**

Under the law,it is assuming that a consumer is a decision maker and he wants to maximize his utility and the tastes, fashion, preferences, and priorities of a consumer remain unchanged.

1. **Marginal utility of money:**

Assuming that the marginal utility of money remains unchanged, otherwise the law of equi marginal utility will not hold true.

**Theory of consumer behaviour-2**

**Indifference curve Approach**

The indifference curve approach was introduced by Prof. Hicks, Prof. Slutsky and Prof. Allen. According to them, utility cannot be measured in numbers and figures, it can be only measured through preferences of a consumer or ranking the preferences which derives from the consumption. This approach is known as Hicksian approach and ordinal utility approach. Indifference curve approach is used to show the preferences of a consumer.

An indifference curve is a contour line that slopes downward from left to right , showing the same level of satisfaction on each point. The given level of income spent on different combinations of two commodities.

Indifference curve is defined as:

“An indifference curve is the locus of different combinations of two commodities which provides equal level of utility to the consumer”.

Another definition is:

“ An indifference curve, with respect to two commodities, is a graph representing those combinations of the two goods that gives the consumer equal level of satisfaction, hence indifferent in having any combination on the curve.”

It is basically as curve that is used in microeconomics which shows what would be the preference of a consumer within limited resources such as a limited budget given all other factors are constant.

It is a downward sloping curve which is convex to the origin. It shows the two goods that are being consumed by the consumer. Assuming that all other factors are constant any point on this curve will give the consumer maximum satisfaction as well as utility. A consumer will equally prefer any of the two goods at any point on the curve. It is drawn on a very simple two dimensional graph. Typically an indifference curve is convex to the origin, and no indifference curves intersect each other. Consumers tend to have more satisfaction if they have goods that they achieve, if it lies on a curve which is more farther away from the origin.

If the consumer is given more budget then he will automatically shift towards a curve that will be more farther away from the origin. In this curve many concepts are taken into account such as marginal utility theory, income, substitution effects and the subjective theory of value. It gives us the optimal choice of goods that a consumer can consumer at any given budget or income.

The slope of this curve is called MRS which is the rate at which a consumer may be willing to give up one good in exchange for the other good. This can depend on what the consumer prefers, what the nature of the commodity is, what quantity will they gain or have to lose etc.

For instance, A kid loves to have toys. Now for a kid an indifference curve can be drawn between two goods that are toys such as a toy truck and a toy aeroplane. Different point on the curve may give him different amount of toy trucks and toy aeroplanes but he will be satisfied at any point since he wants to have toys.

The point where a consumer is more satisfied can depend on the consumer’s preference as well. For example a person likes fruits but even among fruits he likes apples more than oranges. So for such indifference curve the consumer will be satisfied more when he will have more apples than oranges but at any point he will be satisfied since he will be getting fruits at any point.

**Properties of Indifference Curve:**

The indifference curve showing the consumer’s utility and satisfaction between two goods has certain properties which we will discuss below:

1. **Convex to the Origin**:

Indifference curves are negatively sloped from left to right. Their slope is called MRS and it falls from left to right. This negative slope is because of the reason for a consumer to have more quantity of one good, the consumer has to give up some quantity of the other good. Since this shows a negative relation between two goods the curve is negatively sloped. One person has to give up a certain amount of a certain good to have more amount of the other good. At any point on the curve the consumer possess certain quantity of one good and certain quantity of other good. For consumer to move on to another point on the Indifference curve they will have to give up some amount of other good.

For example, Mr A has two different fruits i-e apples and oranges to consume, and he prefer oranges to apples thus in order to increase the consumption of oranges, he has to give up certain units of apples, in order to maintain the same level of satisfaction within his income

Marginal rate of substitution (MRS) is defined as:

The rate at which a consumer can give up some amount of one good in exchange for another good while maintaining the equal level of satisfaction.

1. **Indifference Curve Can Never Be A Straight Line:**

The diminishing marginal rate of substitution is a concept that is taken into account while drawing the Indifference Curve. According to this, the distance between the points cannot be constant. But in a straight curve the distance between the different points is constant which is basically against Marginal rate of substitution. This constant distance is against the Indifference Curve approach.

For example, if Mr A has two goods to consume i-e candy and chocolate. In order to increase the consumption of chocolate by one unit, he must give up 3 units of candies, because the level of satisfaction of candies is less than the chocolates. We cannot say that to increase the consumption of chocolate by one unit, he will give up one unit of candy, in this way the indifference curve cannot be in straight line.

1. **Indifference Curve is not Concave to the Origin:**

According to the diminishing marginal rate of substitution a curve cannot be concave since it is against its principal. In such a curve the Marginal rate of substitution will be increasing but in Indifference Curve the MRS has to decrease hence, it cannot be concave to the origin.

For example, Mr A has the combination of two products to consume i-e Pizza and Pepsi. If a consumer prefers pepsi over pizza, he must give up one unit of pizza in order to increase the 3unit of pepsi. In specific time the preference of a consumer cannot be change or we cannot say that after some time he prefer pizza over pepsi. In other words, it is not possible that a consumer gives up 3 units of pizza to increase one unit of pepsi. The concave line to the origin shows that his preference may change which is against the property of indifference curve.

1. **Higher Satisfaction on Higher Indifference Curve:**

On a higher IC curve which is more father away from the origin a consumer will have more satisfaction as compared to a consumer on a lower indifference curve which is closer to the origin as compared to other curve.

When a curve is farther away from the origin it means that a consumer can have more quantity to spend on the combination of two goods. Hence, a higher curve shows higher utility and satisfaction.

For example, if there are three indifference curve for one consumer, this will show that consumer has three different combination of two commodities. If income of a Mr A is Rs 20, he will select the combination of two product i-e cookies and candies on first indifference curve, he will consume 3 units of candies and 1 unit of cookies. When the income of a consumer increases from Rs 20 to Rs 40, now he is able to consume more units of commodities i-e 6 units of candies and 2 units of cookies at second indifference curve. If the income of a consumer increase further till Rs 60, he will then consume 9 units of candies and 3 units of cookies at third indifference curve, thus we can say the higher level of income and higher indifference curve gives higher level of satisfaction to the consumer.

1. **Indifference Curve never intersects:**

In the previous property we have stated that the higher Indifference Curve will have higher satisfaction but if two Indifference Curves were to intersect that will mean that that at the point of intersection of two curves the consumer will have same satisfaction which goes against what we have studies before and cannot be the case. Hence the Indifference Curves can never intersect.

For example, if there are two indifference curves for Mr A, we can say that higher indifference curve gives higher level of satisfaction, but when these two indifference intersects each other at any point, that point represents the same level of satisfaction of both indifference curve. Before the intersection point on two indifference cureve, we can examine the higher indifference curve give higher level of satisfaction i-e (IC1 and IC2) IC2 is higher indifference curve we can say that it gives maximum level of satisfaction. at point of intersection, it gives equal level of satisfaction from both indifference curve, after the intersection point if any point is taken on these two indifference curve, it can be seen that IC1 is at higher level. Thus the intersection of indifference curve does not gives us clear picture of level of satisfaction from two combinations of product.

1. **Indifference Curve never touches any axis:**

We have stated in the definition that Indifference Curve shows combination of two goods only which gives maximum satisfaction. In case of Indifference Curve touching any axis, it would mean that consumer purchases only one good and spends the entire income on one good only. If the Indifference Curve touches y-axis then that means all the amount is being spend on purchasing one good only and if it touches X-axis that means that the it is being spent on purchasing the other good. This goes against the definition and Indifference Curve has to show a combination of two goods. Hence, Indifference Curve can never touch either of the axis.

For example, If Mr A has choices of combinations of two goods (i-e fries and coke), but he only chooses 3 packs of fries and zero units (bottles) of coke. In other words, Mr A only consume one commodity i-e fries, thus it we can say that indifference curve cannot touches any axis, because in this case it represents the consumption of only one commodity.

1. **Indifference Curve is not parallel to either axis:**

The Indifference curve being parallel to the x-axis or y-axis goes against the law of diminishing rate of substitution. If the Indifference curve is parallel to either axis, it means that only amount of one commodity will change while the amount of other commodity will be constant. This cannot happen. Hence, Indifference curve can never be parallel to the axis.

For example, if Mr A has a combination of two product for consumption i-e sandwich and tea. If he consumes two units of sandwiches and one cup of tea, after than he increases the consumption of three sandwiches without losing the consumption of tea, thus the graph of indifference curve will be drawn parallel to axis, which is against the law of diminishing marginal rate of substitution.

**Budget line:**

In consumer theory, we need to understand how the consumers make decision from their choices; economists may look at what individuals can afford within his income. To make it understandable, we draw the graph of the consumer’s budget constraint. In which, the quantity of one commodity is taken along horizontal axis and the quantity of the other product is taken on vertical axis. The budget constraint represents the various combinations of the two commodities that the consumer can afford within his limited income.

It can be defined as:

“A budget line or price line shows different combinations of two commodities (like X and Y), that the consumer can purchase by spending his all income at the given prices of both commodities”.

Another definition is:

“The Budget Line, also known as Budget Constraint represents all the combinations of two goods that a consumer can afford in given income and at given market prices”.

For example, considering hypothetical consumer, Mr A likes to buy apples and oranges, the number of apples Mr A will buy is on x-axis (Horizontal side) whereas units of oranges were taken along y-axis. If Mr A had unlimited income or if these goods were free of cost, then he could consume these without limit. But Mr A like all of us, faces a budget constraint. Suppose Mr A has income of Rs 20 and he spend his 20Rs on apples and oranges. Assuming that the price of apple is Rs 4 each and price of orange is Rs 2 per unit. Moreover the Rs 20 is the total income of a consumer or budget constraint.

Constructing the budget constraint is a fairly simple process. Each and every point on the budget line represents the income of a consumer i-e Rs 20. In other words, it is the overall income of a consumer which he spent on some unit of apples and oranges

If Mr A spends all his income on apples, which cost Rs4, Mr A can buy Rs 20/4per unit , or 5 of them. And no units can be purchase of oranges at that point. This means that x-intercept is the point (5,0) Here Mr A buys 0 oranges and 5 apples.

If Mr A spends all his income of Rs20 on oranges, which cost Rs 2per unit, he can buy only 10 of them (Rs20/2). This means the Y-intercept is the point (0,10). Here, Mr A buys 10 units of oranges and 0 apples.

By joining these two extremes points, you can find every combination that Mr A can afford within his budget line.

Mathematically it can be written as:

Here Px represents the prices of X commodity (Apples)

Qx represents the quantity of commodity X i-e apples.

Py is the prices of Y commodity i-e oranges

Qy is the quantity of commodity Y i-e oranges

M represents consumer income or budget constraint.

When the expenditure on two goods is exactly equals to its income it represents that income of a consumer is fully spend on given commodities.

Moreover any combination which is chosen inside the budget line shows that income of a consumer is under spent, in other words income of consumer is not fully spent on combinations of two goods i-e apples and oranges.

If any combination is taken outside the budget line, it is unattainable point, which represents that the point cannot be achieved because his expenditures would be more than his income.

**Changes in budget line:**

Following changes occurred in budget line:

1. Shift in budget line:

A shift in budget line is occurred when the relative prices of the two products remaining the same, but income of a consumer changes.

Suppose income of a consumer is Rs 20, and he is able to purchase 3 units of apples at Rs 4 each and 4units of oranges at Rs 2 each. Thus we can say that income is spent on these two products. But if income of a consumer increases from Rs 20 to Rs 30, thus budget line shifts toward right side, or outward direction, which represents that the consumer is able to spend more income on these two products. He can increase his spending. With the increase in his income, the consumer is able to purchase 5 units of apples at Rs 4 each and 5 units of oranges at Rs 2 each to spend his entire money on these two products.

In other case, if income of a consumer falls from Rs 20 to Rs 10, he will then able to purchase fewer units of both the commodities, thus the budget line shifts inward direction. It means that now the consumer is able to purchase 2 units of apples at Rs 4 each and 1 unit of orange at Rs 2 each. Thus his consumption is reduced with the fall in income.

1. Rotation in budget line

A change in budget line is occurred due to change in prices of one product with income (budget) remaining the same.

1. Change in Price of good X

When prices of good X changes but income of a consumer remains same and prices of good Y remains same, thus budget line will rotate.

Considering the previous example the income of a consumer is Rs 20, price of apple per unit is Rs 4 he may purchase 3 units of apples and price of orange per unit is Rs2 and he purchase 4 units of oranges. when price of apples increase from Rs 4 to Rs 6 per unit, thus the consumer is able to purchase less units of apple from3 units to 2 units within his given income, thus budget line rotates inwards. In opposite case when the price of apples falls from Rs 4 to Rs 2 per unit, thus consumer is able to purchase more units of apples with in his income. He may purchase 6 units of apples, thus budget line rotates outward direction, which shows increase in the units of apples.

1. Change in Price of good Y

When price of good Y changes but income of a consumer remains same and prices of good X remains same, thus budget line will rotate.

Considering example the income of a consumer is Rs 20, price of orange per unit is Rs 2 he may purchase 4 units of oranges and price of apple per unit is Rs4 and he purchase 3 units of apples. when price of oranges increase from Rs 2 to Rs 4 per unit, thus the consumer is able to purchase less units of oranges from4 units to 2 units within his given income, thus budget line rotates inwards. In opposite case when the price of oranges falls from Rs 2 to Rs 1 per unit, thus consumer is able to purchase more units of oranges with in his income, thus budget line rotates outward direction, which shows increase in the units of ornges.

**Consumer Equilibrium:**

When individuals make choices about the quantity of commodities to consume, it is a position when he obtains maximum satisfaction from his purchases, given that the prices of two commodities in the market and the amount of money to be spent are equal. Moreover maximizing total utility, the consumer faces different constraints, the most important of which are the consumer's income and the prices of the commodities that the consumer purchases. The consumer's effort to maximize his total utility, subject to these constraints, is known as the consumer's problem. The solution to the consumer's problem, which entails decisions about how much the consumer will consume the units of goods and services, is known as consumer equilibrium.

In other words, consumer equilibrium is that point in budget line and indifference curve where the whole income of a consumer is spent on two commodities and at that point the consumer gets maximum level of satisfaction from these two commodities. The point where budget line intersects the Indifference curve, that point is known as consumer equilibrium.

The consumer’s equilibrium under the indifference curve theory has following two conditions:

1. A given price line should be tangent to an indifference curve or marginal rate of satisfaction of good X for good Y (MRSxy) must be equal to the price ratio of the two goods. i.e.

MRSxy = Px / Py

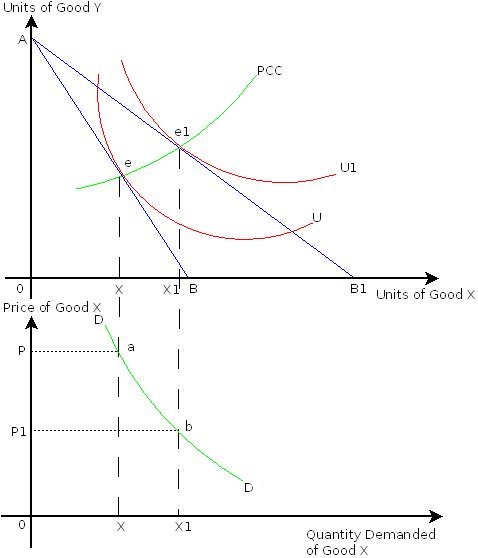
Slope of I.C =slope of budget line

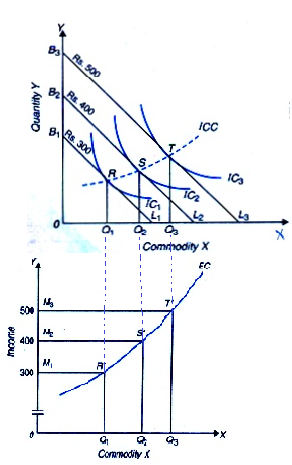
1. The second order condition is that indifference curve must be convex to the origin at the point of tangency

**Derivation of demand curve(for product)**

Demand curve shows the relationship between the quantity of a product demand of a product and its price. It is almost always downward-sloping which shows negative relation between prices and quantity demand. In other words as more people are willing to purchase the product as it becomes cheaper.

To draw a demand curve the information regarding prices of a product at different levels and their corresponding quantities demanded is required. The price-consumption curve can provide this information.

In economics the law of demand is used to derive and recognize the consumer’s wish for a certain product or service that he can buy according to his willingness and the purchasing power which means that the consumer has ability to pay for the product.  
This can be explained by drawing the indifference curve for demand. This curve usually tells us about the behavior a consumer would have according to the different types of goods.  
  
**Derivation:**The derivation of demand curve for the law of demand tells us about the consumer’s desired quantity and its prices through a curve. This relationship between price of goods and the quantity demanded tells us about what a consumer will choose and what will be a consumer’s purchasing power.  
Here is a demand curve:  
  
  
This graph shows the demand curve of normals goods. In general these types of goods will have higher demand when the prices are lower and lower demand when the prices are high. The demand curve for these goods is downward sloping. At any point on this curve the given price will reflect the quantity demanded by the consumer in a certain market. This all can allow the economists to measure or predict that what is the value that a product holds by measuring the demand at a certain price and analysing the consumer’s buying behaviours or patterns.  
  
From the upper graph we can see that the intital budget is on the line AB. This is the budget line. Tangent to it at point e showing the optimal consumption is the indifference curve U.The consumption of goods x on this indifference curve is OX. Now, let us say that the price falls and this shifts the budget line to AB1. At budget line AB1 we have a new indifference curve U1 which is tangent to the budget line at e1 showing the optimal level of consumption with decreased prices. The consumption at this point is OX1. We can see from the above upper graph that the concumption increases from OX to OX1 when the price falls. The prce comsumption curve given by PCC is rising upward due to this.  
Now the lower graph makes it more clear how the prices fall. We can see that intially the price is P and the qunatity demanded is X. At this price we have the corresponding indifference curve U. With the fall in price from P to P1 we can see that the quantity demand increases to X1 and the corresponding indifference curve at fallen price is given by U1. The graph is downward sloping showing the negative relation between the prie and the qunatity demanded. From the above graphs it is clear that as price falls, the bugdet line shifts and the consumer consumes more and purchases more of the commodity of a certain good.   
  
The above lower graph only shows the movement of prices along the curve. This movement shows the amount of quantity that will be purchased at a certain price but other factors are kept constant. Only the price affects the consumer’s desires to purchase a product and not other factors. If other factors are not constant then the demand curve shifts either to the right showing increase in deamdn or to the left showing decrease in demand which is opposite of change in quantity demanded of a commodity and price at a fixed demand level.   
  
**Engel’sCurve:**  
Indifference curve basically tells us about the consumption of a consumer at a certain income level. So, it can be used to derive relationship between what consumers consumes of a certain product and how much of a quantity does he purchase of a certain good. This is also called income consumption curve (ICC).   
In the 19th century a German statistician Ernet Engel (1821-1896) studied different family’s budgets to give conclusion about their pattern of consumption and expenditure meaning what they spend on different kinds of goods and services at different income levels. His conclusions are still considered to be valid.  
His studies showed that as a family income increases the amount they spend on necessities falls and the amount spent on luxuries increases. The poor families spend a large amount of their income on purchasing necessities while the rich families somewhat spend more on luxuries.  
*“The fall in proportion of income spent on necessities and rise in the proportion of income spent on luxuries with increase in income of families gives us pattern of consumption expenditure which is generally called Engel’s law.”*   
 Engel mainly focused on income and expenditure of different goods but the relationship between the income and quantity purchased of goods conveys the same information as Engel’s studies. Both will convey same information about the consumption behavior of a consumer as in both cases the price of goods is kept constant.  
 Thus, we can define Engel’s curve as:  
  *“ The curve which shows the relationship between the income and quantity purchased of certain goods is called Engel’s curve.”*  
Income consumption curve can be used to explain the derivation of Engel’s curve. This is done by relating the quantity purchased of a commodity rather than its expenditure and consumer’s income level.  
It should be kept in mind that the demand curve tells us about the relationship of quantity purchased and the price of goods while the other factors are kept constant and Engel’s curve tells us about the relationship between income and quantity purchased keeping the other factors such as price, consumer’s taste, time of purchase etc constant.

**Derivation of Engel’s Curve:**  
Here is an Engel’s curve:  
  
  
  
To derive Engel curve we look at the income consumption curve in the upper graph. The level of income is taken to be on x-axis and the quantity purchased to be on y-axis. Now keeping in view the upper graph, the income level of consumer’s is assumed to be Rs. 300, Rs.400 and Rs.500. Keeping in view the different indifference curves i.e IC1, IC2 and IC3 we get to know about the preference of the consumer for purchasing two goods X and Y. The ICC shows us the equilibrium quantities purchased by the consumer as the consumer’s income increases from Rs.300 to Rs.400 and then further increases to Rs.500 (income level being showed by the budget lines B1, B2 and B3 in the upper graph).   
Now from the upper graph we can see that the amount purchased by consumer at the given price of good X and Y at income level of Rs.300 is Q1 of the commodity of X. While at the given price of X and Y goods the consumer buys the quantity Q2 and Q3 at the income level of Rs.400 and Rs.500 respectively. In the lower graph we take the commodity’s quantities Q1, Q2 and Q3 and plot it against the income level of Rs.300, Rs.400 and Rs. 500 respectively. We can see that the optimal level of consumption in the upper graph is given by points R,S and T while in the lower graph it is given by R­’, S’ and T’. This is how and Engel’s curve is derived from the income consumption curve (ICC).

**Segregation of substitution affect and income effect of price affect:**The two economics concepts; substitution and income effect express the changes in the market and how their impact consumption pattern for consumer goods and services.  
The substitution effect expresses that the consumption is impacted by changing relative income and prices. When price of one good is increase, the quantity demand of its substitute product also increases increase, while the income effect describes the impact of change in purchasing power on consumption.

## Substitution Effect

The substitution effect occurs when individual replaces cheaper or normal priced items with more expensive product. Such as, Prices of pepsi increases and prices of coke remains constant, the substitution effect occurs when the consumer increases the demand of coke with increase in prices of pepsi.

On the other hand, when income of a consumer falls and prices of a product increases. [Substitution](https://www.investopedia.com/terms/s/substitute.asp) in the direction of purchasing of lower-price products, it has generally negative consequence on retailers because it means lower profits will be generated. It also means fewer options for the consumer.

For instance, if private college tuition fee is more expensive than public college tuition, and money is a concern, consumers will be attracted to public colleges. But a small decrease in private tuition costs may be enough to motivate more students to begin attending private schools.

## Income Effect

The income effect is the change in the consumption of goods and services, depends on income. It means consumers will spend more if their income goes up, and they may spend less if their income falls. But the effect doesn't depict the kind of goods and services that an individual will purchase.

Consumer may select to purchase more expensive product in lesser quantity or purchase cheaper product in greater quantities. It generally depends on their preferences and circumstances.

The income effect has two effects on consumption pattern, direct or indirect. When income of a consumer increases, his spending also increases, the income effect is said to be direct. For example if a consumer income increases, he spend more on shopping. On the other hand, a consumer may spend less on goods whose prices goes up. And spend more on those products whose prices fall, this is indirect effect. For example, clothes prices increases, leaving the consumer with less income to spend on other products.