

Properties of Indifference curve

(1) Indifference Curves Slope Downward from Left to Right:

Indifference curves have a negative slope. This property shows that any increase in the amount of one commodity is accompanied by a reduction in amount of other commodity. This property is derived from the assumption that both the commodities have **positive marginal utilities**. Addition to total utility on account of more of one commodity, say, 'X' should be compensated by equivalent reduction in total utility by a reduction in the quantity of other commodity, say, 'Y' .

In this way, the total utility or satisfaction will remain the same, which is consistent with the **definition of an indifference curve**. Other possibilities for the shape of an indifference curve (horizontal, vertical, upward sloping, etc.) are ruled out on the ground as these will imply **different levels of satisfaction at different points on the curve**. Let us now explain these...

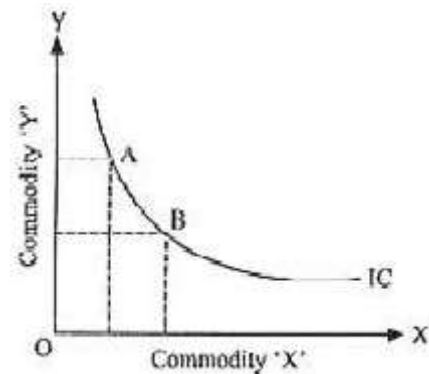


Figure 1

- If an indifference curve were horizontal, this would mean that the consumer is indifferent between two combinations (say, 'A' and 'B' in following Fig.2 a) both of which contain the same amount of 'Y' but combination 'B' has a greater amount of 'X' than combination 'A'.
- Similarly, if an indifference curve were vertical, this would mean that the two combinations 'A' and 'B' with equivalent satisfaction level have the same amount of 'X', but 'B' contains more 'Y' than 'A'.
- Further, if an indifference curve were upward, this would mean that combinations 'A' and 'B' yield same total satisfaction to the consumer, though combination 'B' contains more amount of commodity 'X' as well as 'Y'.

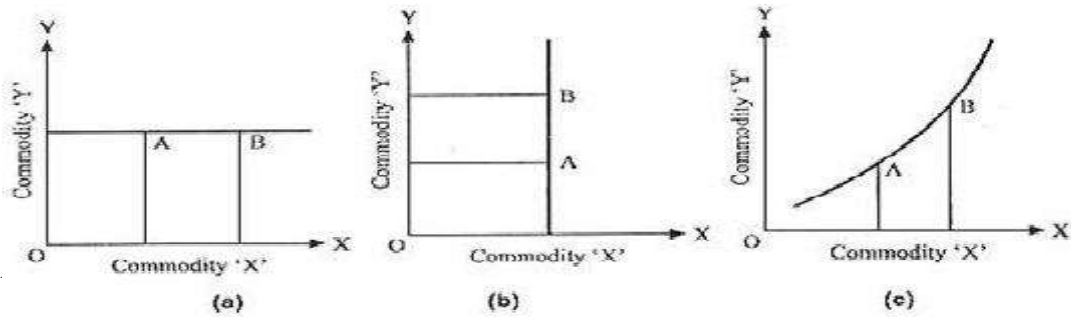


Figure 2

All the above three situations are contrary to the definition of indifference curves that all points on such curves provide same level of satisfaction to the consumer. In these three situations, the level of satisfaction of the consumer rises, as he moves from point 'A' to point 'B' rightwards (Fig. 1 (a)) or upwards (Fig. 1 (b), (c)), since he starts consuming more of at least one commodity with such movement. Therefore, indifference curve cannot be horizontal or vertical. Nor can it slope upward to the right. The only possibility, therefore, is that it must slope downwards to the right.

(2) Indifference Curves are Convex to Origin:

Indifference curves are convex to the point of origin of the two axes, i.e., in the neighborhood of the point of tangency, the indifference curve must lie above the tangent line. The curve is relatively steep at first in its left hand portion and tends to become flatter in its right hand portion.

Thus, as we move along the curve from left downwards to the right, the absolute slope of the indifference curve decreases. This property of indifference curve is based on the principle of diminishing marginal rate of substitution, explained in the previous section.

In Side Fig.3, as the consumer reduces the consumption of commodity 'Y' and increases the consumption of commodity 'X', his urge for more

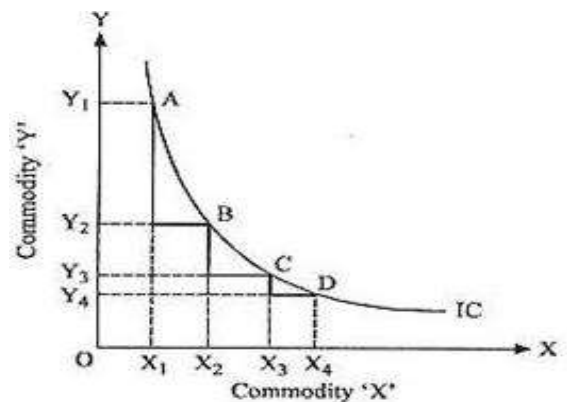


Figure 3

units of 'X' declines continuously. On the other hand, he is willing to leave/sacrifice with fewer and fewer units of commodity 'Y' at each stage to obtain each additional unit of 'X'. In other words, the marginal rate of substitution of 'X' for 'Y' declines, as the consumer moves down on an indifference curve.

Suppose, 'A', 'B', 'C', and 'D' are four points on indifference curve IC in above Fig. 3. Initially, the consumer is willing to sacrifice $Y_1 - Y_2$ units of commodity 'Y' to get one unit $X_1 - X_2$ of commodity 'X'. For additional one unit $X_2 - X_3$ of 'X', he is ready to sacrifice $Y_2 - Y_3$ units of 'Y'. For next one unit $X_3 - X_4$ of 'X', the consumer would like to give up only $Y_3 - Y_4$ units of 'Y' clearly; the increase in 'X' commodity is uniform, whereas 'Y' commodity is decreasing at a diminishing rate. Symbolically,

$$X_1 - X_2 = X_2 - X_3 = X_3 - X_4, \text{ while, } Y_1 - Y_2 > Y_2 - Y_3 > Y_3 - Y_4$$

Hence, indifference curves are convex to the origin. Concavity of the indifference curves is against the principle of diminishing marginal rate of substitution. Let us consider the following Fig. 4 which indicates a concave indifference curve. According to this figure, a consumer is prepared to sacrifice more and more units of commodity 'Y' at each stage to acquire additional units of commodity 'X'.

At point 'A' in the figure, the consumer possesses 1 unit of 'X' and OY_1 units of 'Y'. To obtain 1 more unit of 'X', he is willing to give up $Y_1 - Y_2$ units of 'Y' to acquire further additional units of 'X'; he is ready to part with $Y_2 - Y_3$, $Y_3 - Y_4$ units of 'Y' and so on.

Clearly $Y_1 - Y_2 < Y_2 - Y_3 < Y_3 - Y_4$, so a situation

of increasing marginal rate of substitution has arisen. Such situation is against general consumer behaviour and implies that as the stock of 'Y' diminishes and that of 'X' increases, the marginal utility of 'Y' should fall. As a result, the consumer would be willing to sacrifice larger and larger units of 'Y' to obtain each additional unit of 'X'. Thus, indifference curves cannot be concave to the origin.

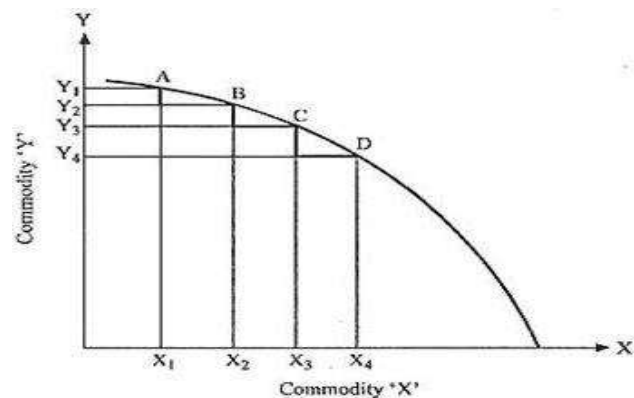


Figure 4

(3) Two Indifference Curves cannot Touch or Intersect Each Other:

Intersection of two indifference curves representing different levels of satisfaction is a logical contradiction. It would mean that indifference curves representing different levels of satisfaction are showing the same level of satisfaction at the point of intersection or contact (Fig. 5).

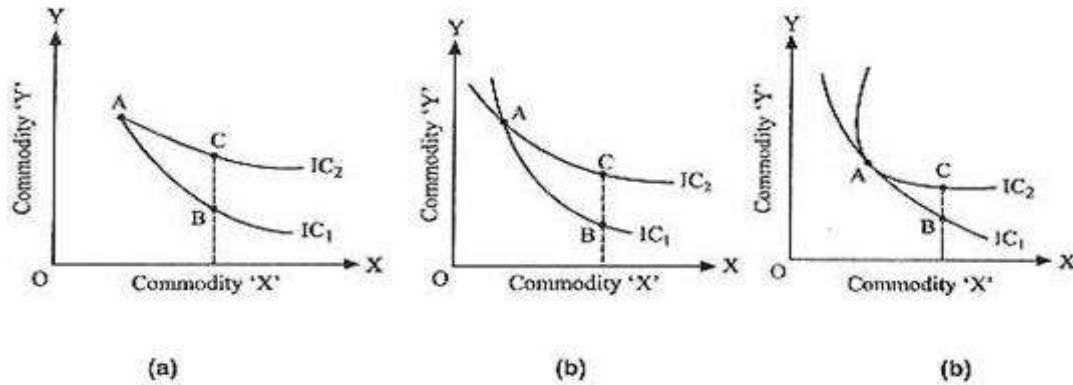


Figure 5

We can prove this property of indifference curves through contradiction. Suppose, two indifference curves IC_1 and IC_2 meet (Fig. 5.(a)), intersect (Fig. 5.(b)) or touch (Fig. 5. (c)) each other at point 'A' in Fig. 5. Point 'C' is taken just above point 'B', such that it contains same amount of commodity 'X' and more amount of commodity 'Y'. Consider points 'B' and 'A' on IC_1 . Consumer is indifferent between these points, as both lie on the same indifference curve IC_1 . Further, points 'A' and 'C' lie on the same indifference curve IC_2 implying same level of satisfaction to the consumer.

Now, by the assumption of transitivity, points 'B' and 'C' yield same level of satisfaction to the consumer. But, point 'C' lies on a higher indifference curve having more amount of commodity 'Y'. It must be preferred to point 'B' by the assumption of non-satiety.

Further, intersection of two indifference curves also violates the assumption of positive marginal utilities of the two commodities. In Fig. 5, intersection of IC_1 and IC_2 means additional amount of BC has zero utility. Therefore, indifference curves can never intersect or touch each other.

(4) Higher Indifference Curves Represent Higher Level of Satisfaction:

An indifference curve, which is nearer to the point of origin represents smaller combinations of the two commodities, while an indifference curve farther from the point of origin represents larger combinations.

Larger combinations of the two commodities provide greater satisfaction than the smaller combinations of the same commodities. Therefore, greater is the distance of an indifference curve from the point of origin, higher it will be in the consumer's preferential order. In other words, indifference curve that lies above and to the right of another indifference curve denotes preferred combinations of commodities and thus yields higher satisfaction.

In Fig. 6, the consumer would prefer to lie on indifference curve IC_2 rather than indifference curves IC_1 though he is indifferent between all points on IC_1 or IC_2 . Points 'B', 'C' or any point between them on indifference curve IC_2 have more of at least one good without having less of the other compared to point 'A' on indifference curve IC_1 .

Therefore, these points on indifference curve IC_2 represent higher satisfaction levels. Since all points on an indifference curve represent same level of satisfaction, so all points on IC_2 imply higher satisfaction as compared to all points on IC_1 . Thus, higher indifference curve suggests higher satisfaction level.

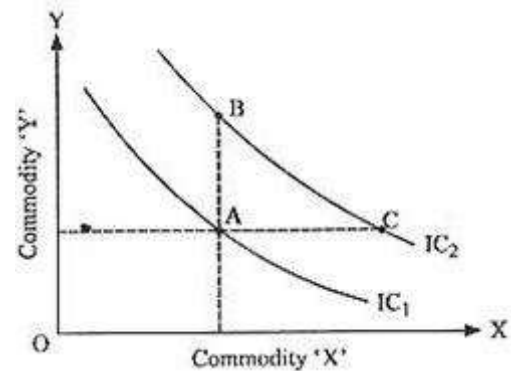


Figure 6

(5) Indifference Curves need not be parallel to Each Other:

The distance between two indifference curves need not be the same on an indifference map. This is an account of three reasons. First, indifference curves are not based on measurable cardinal utility.

Secondly, the marginal rate of substitution for two commodities may not be the same for different indifference curves. Further, the indifference curves have no width and every point in the commodity space has indifference curve through it.