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Introduction to Economics

1.5 PRODUCTION POSSIBILITY CURVE (PPC)

1.5.1 Production Possibility Set and Curve

Production possibility **set** refers to different possible combinations of two goods that can be produced from a given amount of resources and a given level of technology.

*Production possibility curve or frontier (PPF) shows the various alternative combinations of goods and services that an economy can produce when the resources are **all fully and efficiently** employed. PPC shows the obtainable options.*

There is a maximum limit to the amount of goods and services which an economy can produce with the given resources and the state of technology. The resources can be used to produce various alternative goods which are called *production possibilities* and the curve showing the different production possibilities is called production possibility curve.

1.5.2 Assumptions

Assumptions underlying production possibility curve are:

- (a) Economy produces only two goods, X and Y . (Examples of goods X and Y can be gun and butter, wheat and sugar cane, cricket bats and tennis rackets or anything else.)
- (b) Amount of resources available in an economy are given and fixed.
- (c) Resources are not specific, *i.e.*, they can be shifted from the production of one good to the other good.
- (d) Resources are fully employed, *i.e.*, there is no wastage of resources. Resources are not lying idle.
- (e) State of technology in an economy is given and remains unchanged.
- (f) Resources are **efficiently** employed (efficiency in production means output per unit of an input).

1.5.3 Production Possibility Schedule and Curve

PP schedule refers to tabular presentation of different possible combinations of two goods that an economy can produce with given resources and available technology. Table 1.3, gives a production possibility schedule. It shows that, with given resources, an economy can produce either zero unit of X and 21 units of Y or 1 of X and 20 of Y or 2 units of X and 18 units of Y or 3 units of X and 15 units of Y or 4 of X and 11 of Y or 5 of X and 6 of Y or 6 units of X and zero units of Y .

Table 1.3 Production Possibility Schedule

Production Possibility	Good X	Good Y
P	0	21
A	1	20
B	2	18
C	3	15
D	4	11
E	5	6
P'	6	0

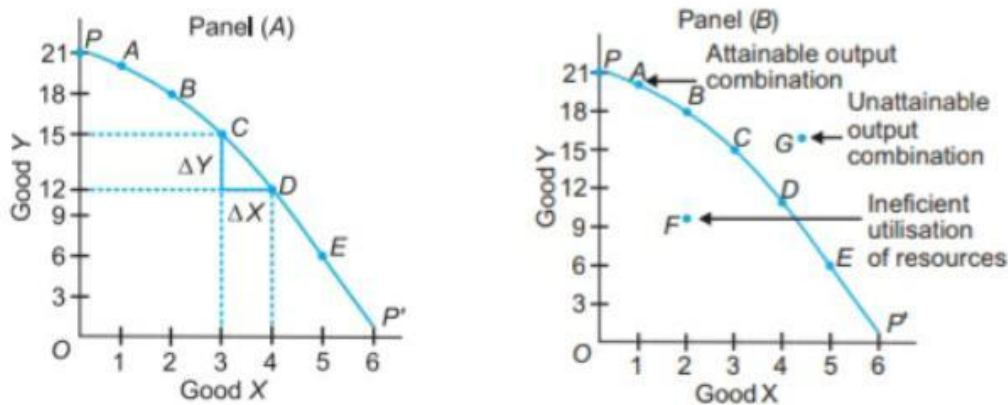


Fig. 1.5 Production possibility curve

Fig. 1.5 illustrates a production possibility curve. Good X is shown on the x -axis and good Y is shown on the y -axis. PP' is the required production possibility curve. It shows, the maximum amount of good X produced, given the amount of the other good. In panel (A), each alternative possibility, *i.e.*, (0, 21), (1, 20), (2, 18), (3, 15), etc., are plotted and points P, A, B, C, D, E and P' are joined by line segments. In panel (B), a smooth PPC is drawn which is based on the assumption that in reality infinite production possibilities exist.

The economy can either produce OP of good Y or OP' of good X or any other combination shown by points A, B, C, D or E. *All points on the curve are attainable. The problem is that of choice, i.e., to choose among the attainable points on the curve.* It depends upon tastes and preferences of an individual. This is the basic problem of an economy. Any point inside the curve, such as point F, indicates unemployment of resources or inefficient use of resources. Any point outside the curve, such as point G, is unattainable given the scarcity of resources. An economy always produces on a PPC.

1.5.4 Features of Production Possibility Curve

Two features of production possibility curve are:

- (a) **PPC slopes downward.** A production possibility curve slopes downward from left to right because under the condition of full employment of resources, production of one good can be increased only after sacrificing production of some quantity of the other good. It is so because resources are scarce. Due to this, production of both goods cannot be increased at the same time. That is why PPC slopes downward.

- (b) **PPC is concave to the origin.** A production possibility curve is concave to the point of origin because of increasing marginal rate of transformation (*MRT*) or increasing marginal opportunity cost (*MOC*). **Slope of PPC is defined as the quantity of good Y given up in exchange for additional unit of good X.**

$$\begin{aligned} \text{[Slope of Production Possibility Curve]} &= \frac{\Delta Y}{\Delta X} = \frac{\text{Amount of Good Y lost}}{\text{Amount of Good X gained}} \\ &= \text{MRT or [Marginal Opportunity Cost]} \end{aligned}$$

Marginal opportunity cost is opportunity cost of good X gained in terms of good Y given up. It is also called **Marginal Rate of Transformation (MRT)**.

Concave shape of PPC means that slope of PPC increase which implies that *MRT* increases. It means that for producing an additional unit of a good, sacrifice of units of other good (*i.e.* opportunity cost) goes on increasing. It is because resources are not equally efficient for the production of both goods. Thus, if resources are transferred from production of one good to another, cost increases *i.e.*, *MRT* or *MOC* increases. It is called **law of increasing opportunity cost**.