

# The economic concepts in the production possibilities frontier

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It is true that scarcity of resources prompts man to study and explore all kinds of possibilities to maximize production in a certain given period of time. In a given economy of two goods, there is an established model that explains the relationships of production efficiency and inefficiency. And in a given example of two kinds of products, there is a corresponding trade-off in order to attain a desired production performance in a given economy.

In economics, the production possibilities frontier (PPF) is a graph that illustrates the possible alternative combinations of two goods that can be produced in a certain period of time under the conditions of a given state of technology and fully employed resources (Arnold, 2008). This definition can be explained best by using concrete samples and illustrations.

But before discussing the details of the first example, if an economy produces two goods, four assumptions must be drawn using a static model: (1) the resources of this economy consist only of labor and capital, (2) the labor and capital is available and given, (3) this economy produces two goods, (4) the technology for production is given (Dwivedi, 2002). In the illustrated example of Dwivedi (2002), the two goods are food and clothing. In Table 1, the production possibilities for these goods are shown.

The alternative A shows that the production is seven thousand tons of food and 0 million meters of clothing, while alternative B shows that production is 6 thousand tons of food and 33 million meters of clothing, and so on. If Table 1 is illustrated in a graph, the result will be a curve shown in Figure 1, which is also the production possibility frontier. In this figure, it can be seen that the Point A lies along the Y-axis since the production for clothing is 0.

This means that if all resources will be spent on food, the maximum production is 7 thousand tons but there will be no output for clothing. And if all resources will be spent in the production of clothing, the maximum output is 80 million meters but 0 output for food, this is why the alternative F lies along the X-axis. Other points along the curve, such as point B, C, D and E illustrate the alternative output or production in this particular economy.

At this stage of discussion, it can be deduced that the change in production of the first good affects the resulting production of the second good and vice versa. This relationship is inversely proportional if graphically interpreted such that increase of production in one good results in a decrease in production for the second good and vice versa. The slope of the curve of production possibility frontier also graphically represents the concept of opportunity cost in economics (Baumol and Blinder, 2008). The opportunity cost is simply the trade-off.

The cost of something is what one has to give up in order to get it (Mankiw, 2008). From the given example in Figure 1, in order to move from point B to point C, the production has to give up one thousand tons of food just to increase the production of clothing by 15 million meters. These values were derived by subtracting the x and y values of point B from point C. But if the movement is reversed, like from point C to point B, it can be said that the production has to give up 15 million meters of clothing just to increase the food production by one thousand tons.

Moreover, if the movement is from point D to E, it can be said that one thousand tons of food has to be given up to increase production of clothing

by 8 million meters. It can be noticed that at this point, same amount of food production was given up; however, the gain or increase in clothing production is not the same as the increase from point B to C movement. Hence, this illustrates that the trade-off or slope is not the same at all points of the curve because that is the characteristic of a concave-downward type of PPF.

And from this emerges another economic concept, the principle of increasing opportunity cost. This means that as the production cost of one good expands, the opportunity cost of producing another unit of this good generally increases (Baumol and Blinder, 2008). There are two identified possible reason why there is an increasing opportunity cost: the first is that factors of production are not homogeneous and often product specific and second is the factor proportion that varies from industry to another industry (Dwivedi, 2002).

But there are also exceptions to this principle of increasing opportunity cost. There are instances when the slope or the opportunity cost is constant. This is illustrated in Figure 3 (Arnold, 2008). Consider the points A, B, C, D, E, and F, the same number (10 thousands per year) of computers is gained or lost at every decrease or increase in the production of (10 thousands per year) television set. Therefore, the ratio of one is to one exists in this trade-off, which means producing 1 unit of computer is equivalent to 1 unit of television set not produced.