

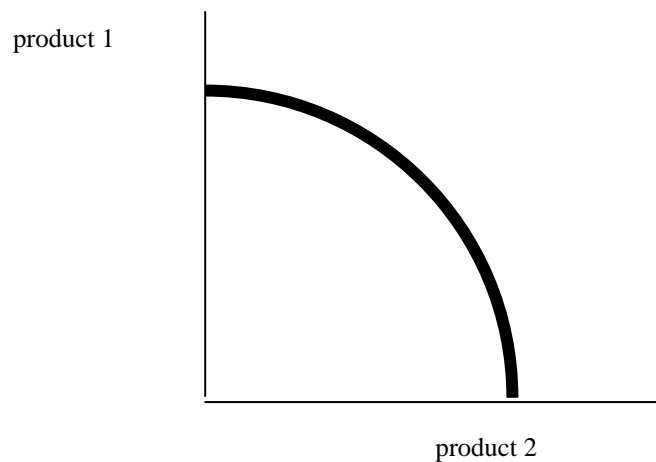
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Principles of Economics

The Production Possibilities Frontier

The production possibilities frontier (also known as the "production possibilities curve") shows the maximum output in an economy with a fixed amount of productive resources, where only two products can be produced.

All productive resources are being fully employed and used efficiently at all points along the production possibilities curve; that's why output is at a maximum on the curve.

Pictured below is a general example of a production possibilities frontier, representing an economy producing two products, "product 1" and "product 2."



If the economy is operating at a point inside of the production possibilities frontier, then maximum output is not being produced; this non-maximum production may be caused by unemployed ("unused") productive resources, inefficient use of productive resources, or both.

The economy cannot operate at any point outside its production possibilities frontier, because of limited resources and technology.

Growth in maximum possible production can be represented by an outward shift of the production possibilities frontier; this shift may result from: (1) an increase in the amount of productive resources, (2) an improvement in technology, or (3) some combination of (1) and (2).

The production possibilities frontier illustrates the concept of economic scarcity; limited productive resources limit the output of an economy. (Consequently, a society must

choose among alternate limited production possibilities to find the one which satisfies its material wants the best.)

The production possibilities frontier also illustrates the notion of opportunity cost; if an economy is operating on its PPF and wishes to produce more of a product, then increased production of the product is obtained only by reducing the production of the other product.

The Production possibilities frontier illustrated on the previous page, because it is bowed out from the origin, illustrates the notion of *increasing* opportunity cost; each additional unit of increased production of one product requires successively *more and more* sacrificed additional production of the other product.

Let us create a fake economy and its PPF:

Example: 4 identical people are stranded together on a deserted island. There are two tasks that a person can do in a day

1. Pick berries. A person can pick, at most, 2 buckets of berries in a day

OR

2. Catch fish. A person can catch, at most 6 fish in a day.

How many berries and fish can this society produce? Here are five possibilities

Possibility 1: All 4 people pick berries

Production: 8 buckets of berries and 0 fish

Possibility 2: 3 people pick berries and 1 catches fish

Production: 6 buckets of berries and 6 fish

Possibility 3: 2 people pick berries and 2 catch fish

Production: 4 buckets of berries and 12 fish

Possibility 4: 1 person picks berries and 3 catch fish

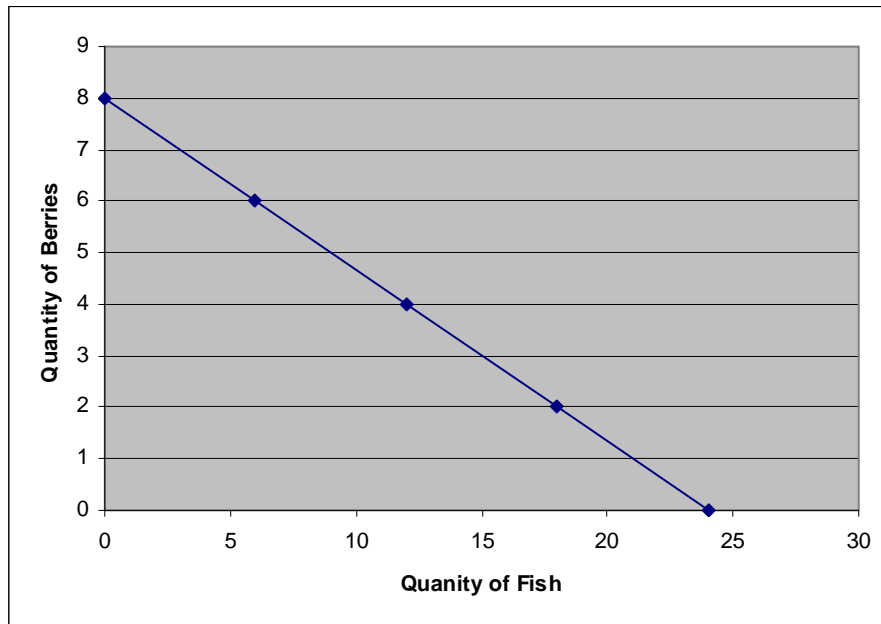
Production: 2 buckets of berries and 18 fish

Possibility 5: 0 people pick berries and all four catch fish

Production: 0 buckets of berries and 24 fish

Of course, there are other possibilities besides the five listed above, if one or more of the people spends part of the day fishing and part of the day gathering berries. If this happens then the economy will be somewhere in between possibility 1 and possibility 5 shown above.

Let us graph these five possibilities and connect them. See next page:



The downward-sloping line above is the island's PPF. Each day, the people on the island must choose a point on the line (one of the five points that we listed on the last page, or some point in between them).

If they want more fish, they must spend more time fishing and less time gathering berries, so the cost of more fish is lost berry production. Similarly, if they want more berries they must spend more time picking berries and less time fishing, so the cost of more berries is less fish production.

The **marginal rate of transformation (MRT)** is an exact measure of the amount of one good that must be sacrificed in order to increase production of another good.

In our island economy, the MRT is “6 fish to 2 buckets of berries” because

- To get six more fish, one person on the island must give up picking berries, resulting in two fewer buckets of berries produced
- AND
- To get two more buckets of berries, one person on the island must give up fishing, resulting in six fewer fish being caught

One can imagine the islander debating what to do. The people who like fish might want the islanders to do more fishing, but the people who like berries would object because that would mean less berries. In fact, berry lovers might propose the opposite—more berries (resulting in less fish).

Similar debates rage in the U.S. and other countries. Sure, there are many more options in a real country besides producing two goods like berries and fish. But the fact remains: If a country wants more of something, then there will be less of at least one other thing. There is no free pile of money sitting around waiting to be used. There is no free lunch.