

## Theory of comparative advantage: Some examples

In economics, the law of comparative advantage refers to the ability of a party (an individual, a firm, or a country) to produce a particular good or service at a lower marginal cost and opportunity cost than another party. It can be contrasted with absolute advantage which refers to the ability of a party to produce a particular good at a lower absolute cost than another.

Comparative advantage explains how trade can create value for both parties even when one can produce all goods with fewer resources than the other. The net benefits of such an outcome are called gains from trade.

### Origins of the theory

David Ricardo explained comparative advantage in his 1817 book *On the Principles of Political Economy and Taxation* in an example involving England and Portugal. In Portugal it is possible to produce both wine and cloth with less labor than it would take to produce the same quantities in England. However the relative costs of producing those two goods are different in the two countries. In England it is very hard to produce wine, and only moderately difficult to produce cloth. In Portugal both are easy to produce. Therefore while it is cheaper to produce cloth in Portugal than England, it is cheaper still for Portugal to produce excess wine, and trade that for English cloth. Conversely, England benefits from this trade because its cost for producing cloth has not changed but it can now get wine at a lower price, closer to the cost of cloth. The conclusion drawn is that each country can gain by specializing in the good where it has comparative advantage, and trading that good for the other.

### Example 1

Two men live alone on an isolated island. To survive they must undertake a few basic economic activities like water carrying, fishing, cooking and shelter construction and maintenance. The first man is young, strong, and educated. He is also, faster, better, more productive at everything. He has an absolute advantage in all activities. The second man is old, weak, and uneducated. He has an absolute disadvantage in all economic activities. In some activities the difference between the two is great; in others it is small.

Despite the fact that the younger man has absolute advantage in all activities, it is not in the interest of either of them to work in isolation since they both can benefit from specialization and exchange. If the two men divide the work according to comparative advantage then the young man will specialize in tasks at which he is most productive, while the older man will concentrate on tasks where his productivity is only a little less than that of the young man. Such an arrangement will increase total production for a given amount of labor supplied by both men and it will benefit both of them.

### Example 2

Suppose there are two countries of equal size, Northland and Southland, that both produce and consume two goods, Food and Clothes. The productive capacities and efficiencies of the countries are such that if both countries devoted all their resources to Food production, output would be as follows:

- Northland: 100 tonnes
- Southland: 400 tonnes

If all the resources of the countries were allocated to the production of Clothes, output would be:

- Northland: 100 tonnes
- Southland: 200 tonnes

Assuming each has constant opportunity costs of production between the two products and both economies have full employment at all times. All factors of production are mobile within the countries between clothing and food industries, but are immobile between the countries. The price mechanism must be working to provide perfect competition.

Southland has an absolute advantage over Northland in the production of Food and Clothing. There seems to be no mutual benefit in trade between the economies, as Southland is more efficient at producing both products. The opportunity costs shows otherwise. Northland's opportunity cost of

producing one tonne of Food is one tonne of Clothes and vice versa. Southland's opportunity cost of one tonne of Food is 0.5 tonne of Clothes. The opportunity cost of one tonne of Clothes is 2 tonnes of Food. Southland has a comparative advantage in food production, because of its lower opportunity cost of production with respect to Northland. Northland has a comparative advantage over Southland in the production of clothes, the opportunity cost of which is higher in Southland with respect to Food than in Northland.

To show these different opportunity costs lead to mutual benefit if the countries specialize production and trade, consider the countries produce and consume only domestically. The volumes are:

Production and consumption before trade		
	Food	Clothes
Northland	50	50
Southland	200	100
TOTAL	250	150

This example includes no formulation of the preferences of consumers in the two economies which would allow the determination of the international exchange rate of Clothes and Food. Given the production capabilities of each country, in order for trade to be worthwhile Northland requires a price of at least one tonne of Food in exchange for one tonne of Clothes; and Southland requires at least one tonne of Clothes for two tonnes of Food. The exchange price will be somewhere between the two. The remainder of the example works with an international trading price of one tonne of Food for 2/3 tonne of Clothes.

If both specialize in the goods in which they have comparative advantage, their outputs will be:

Production after trade		
	Food	Clothes
Northland	0	100
Southland	300	50
TOTAL	300	150

World production of food increased. Clothing production remained the same. Using the exchange rate of one tonne of Food for 2/3 tonne of Clothes, Northland and Southland are able to trade to yield the following level of consumption:

Consumption after trade		
	Food	Clothes
Northland	75	50
Southland	225	100
World total	300	150

Northland traded 50 tonnes of Clothing for 75 tonnes of Food. Both benefited, and now consume at points outside their production possibility frontiers.

### Assumptions in Example 2

- **Two countries, two goods** - the theory is no different for larger numbers of countries and goods, but the principles are clearer and the argument easier to follow in this simpler case.

- **Equal size economies** - again, this is a simplification to produce a clearer example.
- **Full employment** - if one or other of the economies has less than full employment of factors of production, then this excess capacity must usually be used up before the comparative advantage reasoning can be applied.
- **Constant opportunity costs** - a more realistic treatment of opportunity costs the reasoning is broadly the same, but specialization of production can only be taken to the point at which the opportunity costs in the two countries become equal. This does not invalidate the principles of comparative advantage, but it does limit the magnitude of the benefit.
- **Perfect mobility of factors of production within countries** - this is necessary to allow production to be switched without cost. In real economies this cost will be incurred: capital will be tied up in plant (sewing machines are not sowing machines) and labour will need to be retrained and relocated. This is why it is sometimes argued that 'nascent industries' should be protected from fully liberalised international trade during the period in which a high cost of entry into the market (capital equipment, training) is being paid for.
- **Immobility of factors of production between countries** - why are there different rates of productivity? The modern version of comparative advantage (developed in the early twentieth century by the Swedish economists Eli Heckscher and Bertil Ohlin) attributes these differences to differences in nations' factor endowments. A nation will have comparative advantage in producing the good that uses intensively the factor it produces abundantly. For example: suppose the US has a relative abundance of capital and India has a relative abundance of labor. Suppose further that cars are capital intensive to produce, while cloth is labor intensive. Then the US will have a comparative advantage in making cars, and India will have a comparative advantage in making cloth. If there is international factor mobility this can change nations' relative factor abundance. The principle of comparative advantage still applies, but who has the advantage in what can change.
- **Negligible transport cost** - Cost is not a cause of concern when countries decided to trade. It is ignored and not factored in.
- **Assume that half the resources are used to produce each good in each country.** This takes place before specialization
- **Perfect competition** - this is a standard assumption that allows perfectly efficient allocation of productive resources in an idealized free market.

### Example 3

The economist Paul Samuelson provided another well known example in his *Economics*. Suppose that in a particular city the best lawyer happens also to be the best secretary, that is he would be the most productive lawyer and he would also be the best secretary in town. However, if this lawyer focused on the task of being an attorney and, instead of pursuing both occupations at once, employed a secretary, both the output of the lawyer and the secretary would increase. The example given by Greg Mankiw in his *Economics* textbook is almost identical although instead of a lawyer and a secretary, it uses Tiger Woods who is supposed to be both the best golf-player and the fastest lawnmower.