

TECHNICAL NOTE: ABSOLUTE VS. COMPARATIVE ADVANTAGES

1 Detecting gains from trade

According to the principle of **absolute advantage** (by Adam Smith, 1723-1790), a country has an absolute advantage over its trading partner

- either if it is able to produce more of a good or service with the same amount of resources,
- or if it is able to produce the same amount of a good or service with fewer resources.

If a country that has an absolute advantage in a particular good produces this good and exports it to another country, which in turn specializes in the production of a different good for which it has an absolute advantage, there are mutual gains from trade.

The theory of **comparative advantage** (by David Ricardo, 1772-1823) explains why it can be beneficial for two countries to trade, even though one of them is able to produce every item more cheaply than the other. What matters is not the absolute cost of production, but rather the ratio between how easily the two countries can produce different goods. Each country should specialize in the production whose opportunity cost is lower with respect to the other country.

The following two general cases show how to detect absolute and comparative advantages in a setting with **two countries (A and B)** and **two goods (X and Y)**. In both cases, it is assumed that labor is the only factor of production.

2 A first formulation

Assume that in order to produce a single unit of good X, country A uses L_A^X units of labor, while country B uses L_B^X units. Similarly, in order to produce a single unit of good Y, country A uses L_A^Y units of labor, while country B uses L_B^Y units. In this case, the country which uses a lower amount of labor to produce a single unit of a particular good is more efficient than the other in the production of that good. That is:

- if country A is more efficient than B in producing X ($L_A^X < L_B^X$), A has an absolute advantage in X;
- if country B is more efficient than A in producing X ($L_A^X > L_B^X$), B has an absolute advantage in X;
- if country A is more efficient than B in producing Y ($L_A^Y < L_B^Y$), A has an absolute advantage in Y;
- if country B is more efficient than A in producing Y ($L_A^Y > L_B^Y$), B has an absolute advantage in Y.

We can observe four different situations:

1. If A has an absolute advantage in X and B in Y, end of the story: A produces and exports X, while B produces and exports Y.
2. If A has an absolute advantage in Y and B in X, end of the story: A produces and exports Y, while B produces and exports X.
3. If A has an absolute advantage in both X and Y, gains from trade are not clearly detected by absolute advantages and we must look at comparative advantages.
4. If B has an absolute advantage in both X and Y, gains from trade are not clearly detected by absolute advantages and we must look at comparative advantages.

To identify comparative advantages (as required by situations 3 and 4), we must calculate the opportunity cost of a good in terms of the other in both countries. For this formulation:

- in country A, the opportunity cost of X in terms of Y is: L_A^X/L_A^Y ;
- in country A, the opportunity cost of Y in terms of X is: L_A^Y/L_A^X ;
- in country B, the opportunity cost of X in terms of Y is: L_B^X/L_B^Y ;
- in country B, the opportunity cost of Y in terms of X is: L_B^Y/L_B^X .

If the opportunity cost of X in terms of Y is lower in A than in B, A has a comparative advantage in X, while B has a comparative advantage in Y. Country A produces and exports X, while B produces and exports Y. If the opportunity cost of X in terms of Y is greater in A than in B, B has a comparative advantage in X, while A has a comparative advantage in Y. Country A produces and exports Y, while B produces and exports X. Only if the opportunity cost is exactly the same in the two countries (unusual), there are no clear gains from trade.

3 A second formulation

Assume now that, by using a single unit of labor, country A can produce Q_A^X units of X, while country B can produce Q_B^X units. Similarly, with the same single unit of labor, country A can produce Q_A^Y units of Y, while country B can produce Q_B^Y units. With this formulation, the country that produces more of a particular good by using a single unit of labor is more efficient than the other in the production of that good. That is:

- if country A is more efficient than B in producing X ($Q_A^X > Q_B^X$), A has an absolute advantage in X;
- if country B is more efficient than A in producing X ($Q_A^X < Q_B^X$), B has an absolute advantage in X;
- if country A is more efficient than B in producing Y ($Q_A^Y > Q_B^Y$), A has an absolute advantage in Y;
- if country B is more efficient than A in producing Y ($Q_A^Y < Q_B^Y$), B has an absolute advantage in Y.

Again, we can observe four different situations:

1. if A has an absolute advantage in X and B in Y, end of the story: A produces and exports X, while B produces and exports Y;
2. if A has an absolute advantage in Y and B in X, end of the story: A produces and exports Y, while B produces and exports X;
3. if A has an absolute advantage in both X and Y, gains from trade are not clearly detected by absolute advantages and we must look at comparative advantages;
4. if B has an absolute advantage in both X and Y, gains from trade are not clearly detected by absolute advantages and we must look at comparative advantages.

To identify comparative advantages (as required by situations 3 and 4), we must calculate the opportunity cost of a good in terms of the other in both countries. For this formulation:

- in country A, the opportunity cost of X in terms of Y is: Q_A^Y/Q_A^X ;
- in country A, the opportunity cost of Y in terms of X is: Q_A^X/Q_A^Y ;
- in country B, the opportunity cost of X in terms of Y is: Q_B^Y/Q_B^X ;
- in country B, the opportunity cost of Y in terms of X is: Q_B^X/Q_B^Y .

If the opportunity cost of X in terms of Y is lower in A than in B, A has a comparative advantage in X, while B has a comparative advantage in Y. Country A produces and exports X, while B produces and exports Y. If the opportunity cost of X in terms of Y is greater in A than in B, B has a comparative advantage in X, while A has a comparative advantage in Y. Country A produces and exports Y, while B produces and exports X. Only if the opportunity cost is exactly the same in the two countries (unusual), there are no clear gains from trade.