**International Economics**  
**Production Possibilities and Consumption Possibilities**

Main points to keep in mind:
- Consumption possibilities are determined by income and prices;
- income is earned by participation in productive activity and the sale of the goods produced;
- nominal prices are determined by activity requirements and wages (in autarky) but
- relative prices are determined by domestic opportunity costs (in autarky) and by
  international supply and demand conditions in trade.

Assume a country's PPF is defined by a total labor endowment of 50 and the production functions:

\[
X = 2 \ L_x \quad \text{so the activity requirement in } X = 0.5 \text{ units of labor}
\]

\[
Y = 5 \ L_y \quad \text{so the activity requirement in } Y = 0.2 \text{ units of labor}
\]

With 50 labor, the maximum production of X is 100 units and the maximum production of Y is 250 units.

![Production Possibility Frontier](image)

Labor is the only factor of production and all factor payments go to labor
(profit rate is assumed to be zero; you are welcome to assume a profit rate of 25 percent over labor costs,
and see if it makes any difference to the conclusions).

If the wage is $100, then the labor cost of one unit of good X = 0.5 units of labor per unit * $100 wage = $50;
the labor cost of good Y = 0.2 * $100 = $20, and the relative price \( \frac{P_x}{P_y} = \frac{50}{20} = 2.5 \).

Assume that our economy in autarky begins by producing 125 units of Y and 50 units of X.
What is the national income? (GDP = market value of all goods and services produced = $X + Py Y)

GDP = Px X + Py Y = $50 \times 50 + $20 \times 125 = $5,000
Total wage income = $100 per worker \times 50 workers = $5,000

What are the different consumption possibilities on the basis of this national income?

First of all, it is clearly possible to buy the bundle of goods we have actually produced (and of course, in autarky this is exactly what the country will do).

But it is also possible for consumers to decide they will spend all their income on good X.

They can, if they look at the prices specified, buy $5,000 / $50 = 100 units of good X or $5,000 / $20 = 250 units of good Y.

Note that if consumers actually try to spend all their income on good X, they will find that only 125 units of good X are out there, and there would be an excess demand for X. Consumers would bid up the price of good X, and producers of Y (who are stuck with an excess supply of good Y) would exit the Y industry and enter the X industry.

Also note that the CPF is exactly the same as the PPF (except for the color and title) in this graph.
Trade brings benefits, even if the production point does not change

How does trade change this picture? Domestic production possibilities do not change, but prices do. If our country has a comparative advantage in X, it will export good X and import good Y. Since foreign demand is being added to domestic demand for good X, the price of X will increase; since foreign supply is being added to domestic supply for good Y, the price of Y will decrease.

Note: The rigorous determination of the exact prices would require us to:
-- specify demand more exactly than I want to do right now (we would have to introduce indifference curves and offer curves for both countries) if we want to determine relative prices
-- discuss how the Central Bank of our country would handle the problem of the overall price level to determine nominal prices.

and I will avoid this by simply assuming changes in nominal prices consistent with the basic direction of change spelled out in the last paragraph.

Let us assume that after trade, the price of X rises to $ 60 and the price of Y falls to $ 15.

Assume that the production bundle remains the same. What is GDP or national income?
Answer: \( P_x X + P_y Y = 60 \times 50 + 15 \times 125 = 3000 + 1875 = 4875. \)
Nominal GDP has decreased from $ 5000; before jumping to the conclusion that we are worse off, consider what national income will buy:

a. We can buy a maximum of $ 4875 / $ 60 = 81.25 units of X.
   This doesn't sound so good -- we were able to buy 100 units of X in autarky.
   But then we had the chance to buy 100 units of X in autarky and we didn't.
   We revealed by our choice that we preferred a bundle of 50 X and 125 Y to a bundle of 81.25 X and 46.875 Y (which was possible to produce under autarky).
   (The above is an example of a revealed preference argument, first used by Paul Samuelson).

b. We can buy a maximum of $ 4875 / $ 15 = 325 units of Y.
   This is more than we could produce in autarky, so the fall in the price of Y gives us more choices than we had before.

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\text{CPF and PPF after trade}
\]

\[
\begin{array}{c}
\begin{array}{c}
\text{GOOD Y} \\
0 \quad 100 \\
\end{array} \\
\begin{array}{c}
\text{GOOD X} \\
0 \quad 100 \\
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
0 \\
100 \\
200 \\
300 \\
400 \\
\end{array} \\
\begin{array}{c}
\text{GOOD Y} \\
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
[50,125] \\
[0,325]
\end{array}
\end{array}
\]
Specialization after trade brings greater benefits (at least in the Ricardian model).

At the given international prices, specializing in Good X would bring us a GDP of $ 6000. It would therefore enable us to buy:

- $ 6000 / $ 60 = 100 units of good X if we spent all our money on good X
- $ 6000 / $ 15 = 400 units of good Y if we spent all our money on good Y.
- $ 3000 / $ 60 = 50 units of good X AND $ 3000 / $ 15 = 200 units of good Y if we spend half our money on each good, we obtain the same amount of X and more of Y than we had in autarky. Gains from trade here are clear.

What is the mechanism which would lead to specialization? The simplest way to see it is to note that if wages stay fixed at $ 100 after trade, the cost of production of good X remains $ 50 per unit, and it is now selling at $ 60. Firms in the X industry make profits, and profits will attract entry into the X industry. They will also increase the demand for labor in the X industry, and so will increase wages in the X industry.

Meanwhile, at wages of $ 100, the cost of production of good Y is still $ 20 per unit, but the price of Y has fallen to $ 15. Firms trying to produce good Y will lose money unless their employees take wage cuts (but why should they agree to wage cuts when the X industry is hiring?).

With the X industry expanding and the Y industry contracting, the country is moving toward specialization in X.