International trade

L6

Relative price and opportunity cost

- Budget constraint
- Budget line
- Slope of Budget line

Budget costraint

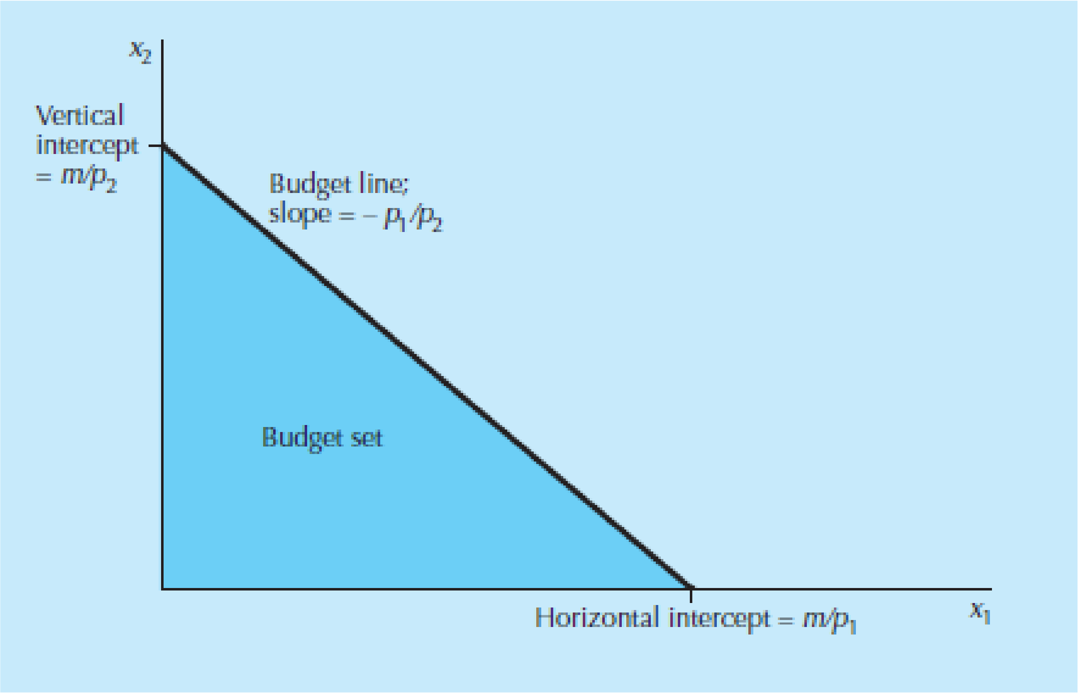
- We suppose that we can observe the prices of the two goods, (p_1, p_2), and the amount of money the consumer has to spend, m.
- Then the budget constraint of the consumer can be written as
- $$p_1x_1 + p_2x_2 \leq m$$
- Here p_1x_1 is the amount of money the consumer is spending on good 1, and p_2x_2 is the amount of money the consumer is spending on good 2.
- **The budget constraint of the consumer requires that the amount of money spent on the two goods be no more than the total amount the consumer has to spend.**
- The consumer's *affordable* consumption bundles are those that don't cost any more than m. We call this set of affordable consumption bundles at prices p_1 & p_2, and income m the **budget set** of the consumer.

Budget line

- The **budget line** is the set of bundles that cost exactly m:

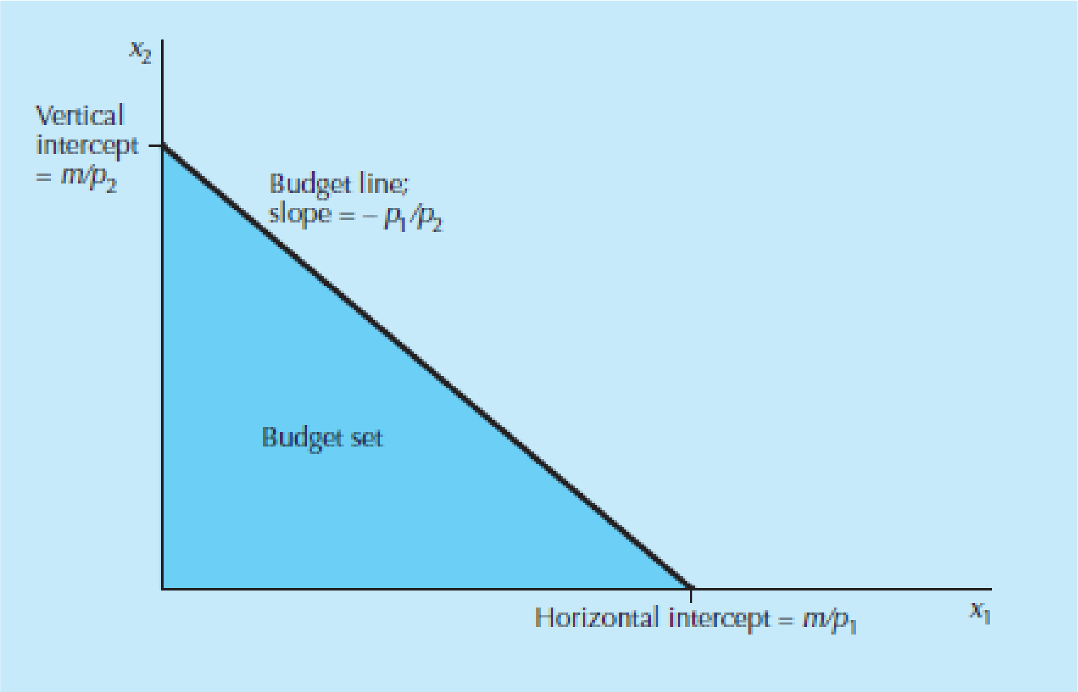
$$p_1 x_1 + p_2 x_2 = m$$

These are the bundles of goods that just exhaust the consumer's income



Budget line

- We can rearrange the budget line in equation to give us the formula
- $p_1x_1 + p_2x_2 = m$
- $x_2 = \frac{m}{p_2} - \frac{p_1}{p_2}x_1$
- Budget line: vertical intercept of m/p_2 and a **slope of –** p_1/p_2.



Slope of budget line

- The **slope of the budget line** measures **the rate at which the market is willing to "substitute" good 1 for good 2**.
- Suppose for example that the consumer is going to increase her consumption of good 1 by Δ*x*1.1 How much will her consumption of good 2 have to change in order to satisfy her budget constraint?
- Let us use Δ*x*2 to indicate her change in the consumption of good 2. If she satisfies her budget constraint before and after making the change she must satisfy
- $$p_1x_1 + p_2x_2 = m \qquad \textit{(1)} \text{ and}$$
- $$p_1(x_1{+}\Delta x_1) + p_2(x_2{+}\Delta x_2) = m \quad \textit{(2)}$$
- Subtracting the first equation (1) from the second (2) gives
- $$p_1\Delta x_1 + p_2\Delta x_2 = 0$$
- This equation states that the total value of the change in consumer's consumption must be zero.

Slope of budget line (BL)

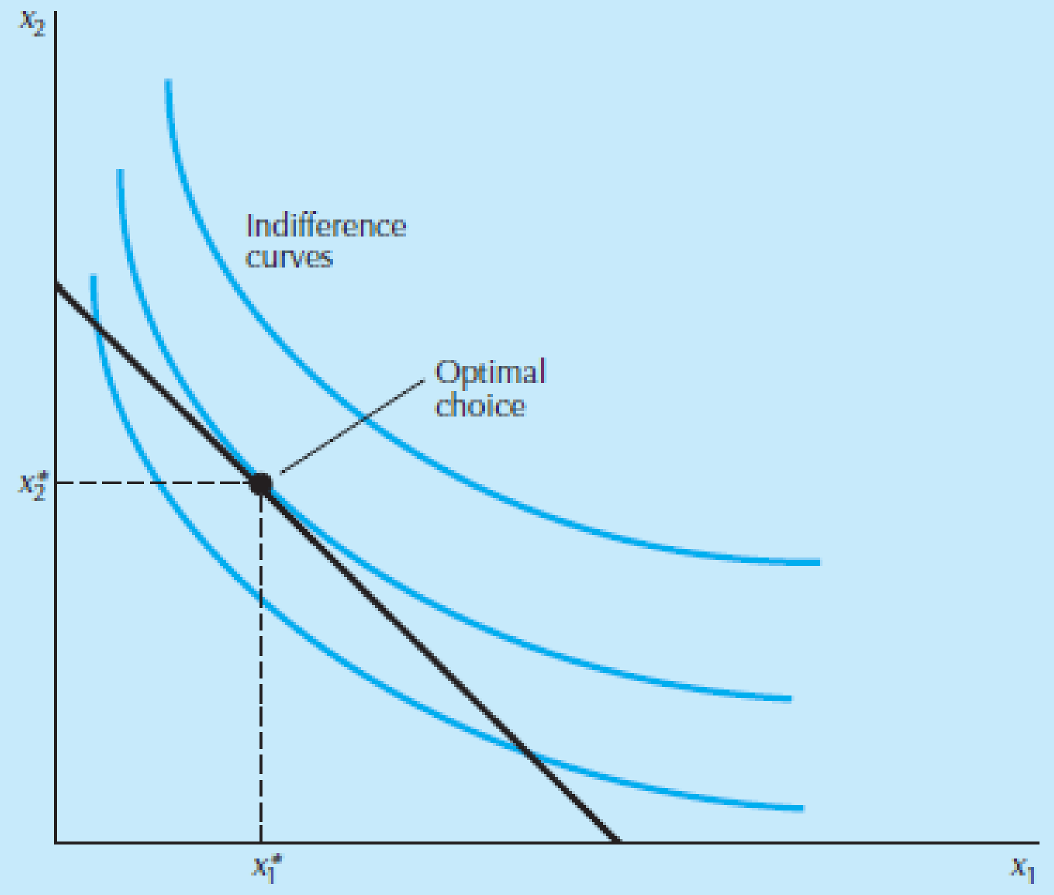
Let

- $p_1 \Delta x_1 + p_2 \Delta x_2 = 0$
- This equation states that the total value of the change in consumer's consumption must be zero.
- Solving for $\Delta x_2 / \Delta x_1$, the rate at which good 2 can be substituted for good 1 while still satisfying the budget constraint, gives
- $$\Delta x_2 / \Delta x_1 = -\frac{\boldsymbol{P_1}}{\boldsymbol{p_2}}$$
- **This is just the slope of the budget line .**
- The negative sign is **there since Δx_1 and Δx_2 must always have opposite signs**. If you consume more of good 1, you have to consume less of good 2 and vice versa if you continue to satisfy the budget constraint.

- **Slope of Budget Line (BL)= Opportunity cost of consuming goods**

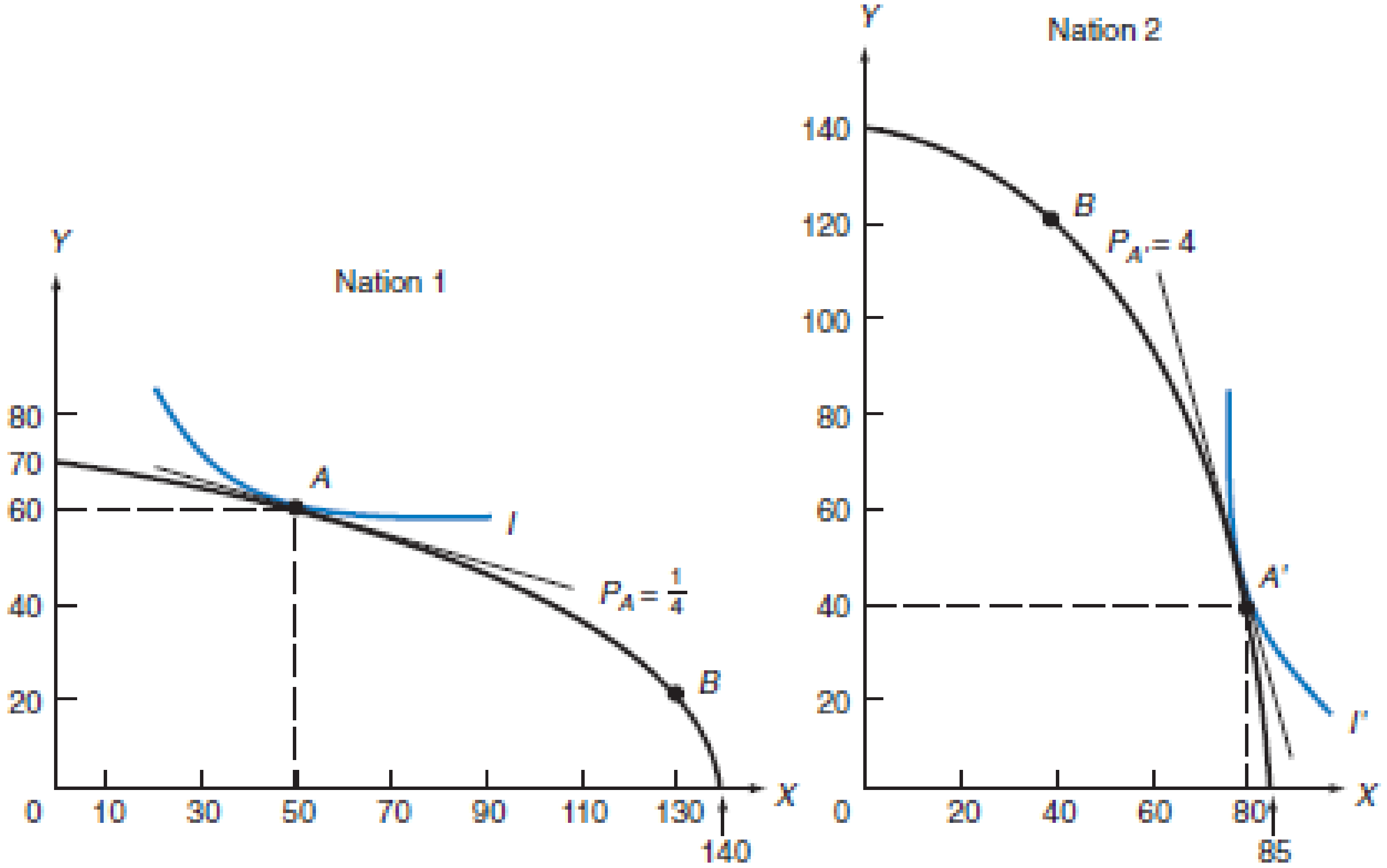
Optimal choice (IC and BL)

- The optimal choice is where IC is tangent to Budget line
- Hence at optimal choice the slope of BL =slope of IC
- That is at optimal choice of consumer relative price is the slope of IC



Optimal choice. The optimal consumption position is where the indifference curve is tangent to the budget line.

Equilibrium in Isolation

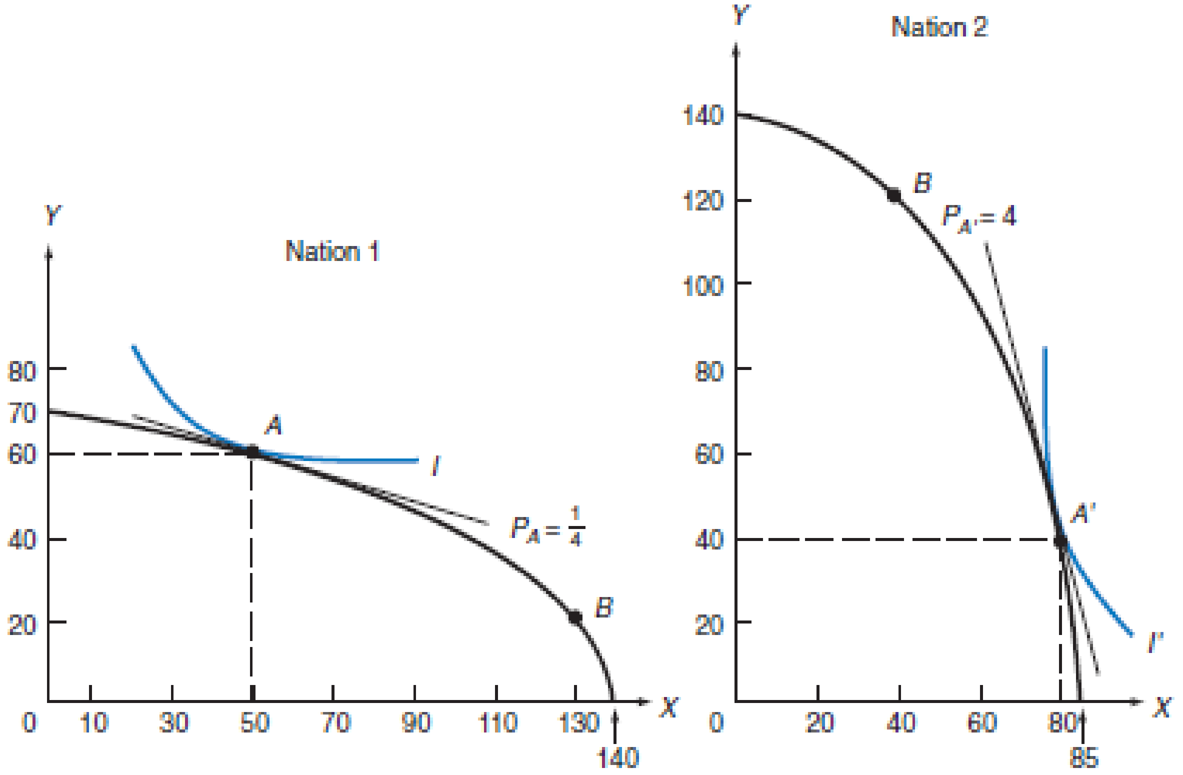


Equilibrium in Isolation

At Equilibrium CIC I is the highest IC that Nation I can reach with its production frontier.

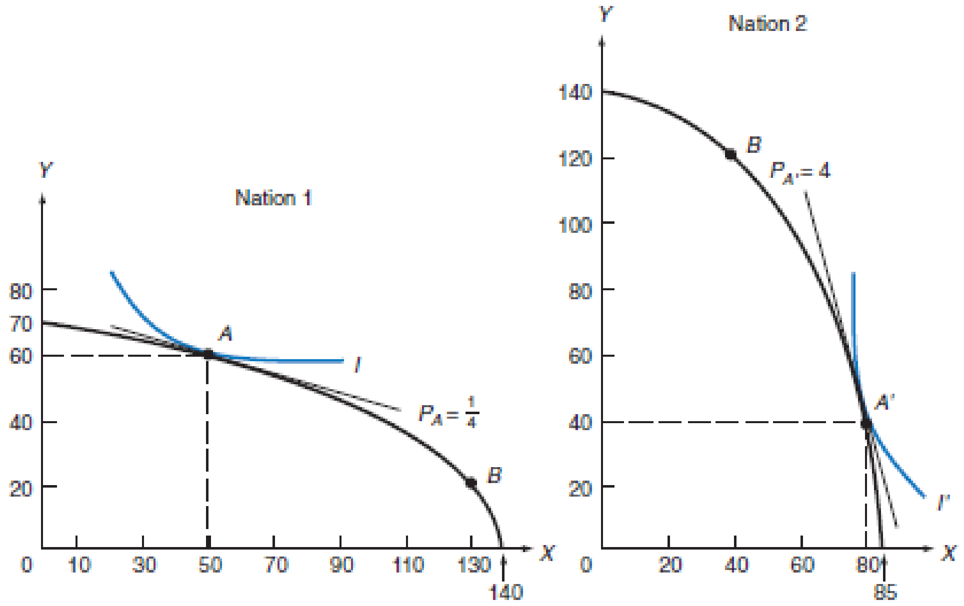
Thus Nation 1 is in equilibrium and maximizes welfare when it produces and consumes at point A in the absence of trade (or autarky)

Similarly, Nation 2 is in equilibrium at point A´ where its PPF is tangent to CIC I´



Equilibrium relative commodity price in Isolation

The **equilibrium-relative commodity price** in isolation **is given by the slope of the tangent common to the nation's production frontier and indifference curve at** the autarky **point of production and consumption**.



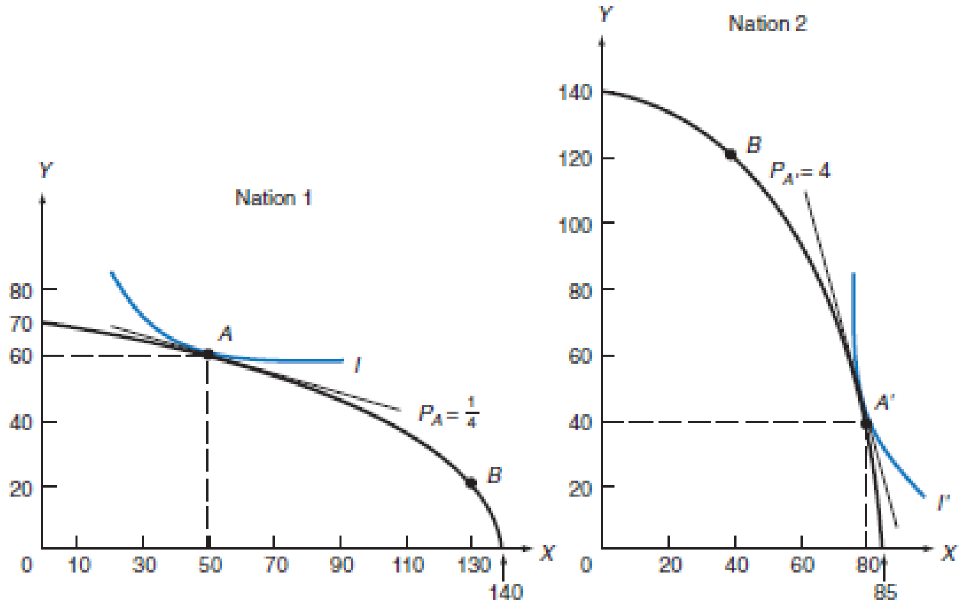
Equilibrium relative commodity price and comparative advantage

If, the equilibrium-relative price of X (i.e. the opportunity cost) in isolation is

$P_A = {}^{P_x}/_{P_Y} = 1/4$ in Nation 1 and

$P_{A'} = {}^{P_x}/_{P_Y} = 4$ in Nation 2 .

Relative prices are different in the two nations because their production frontiers and indifference curves differ in shape and location.



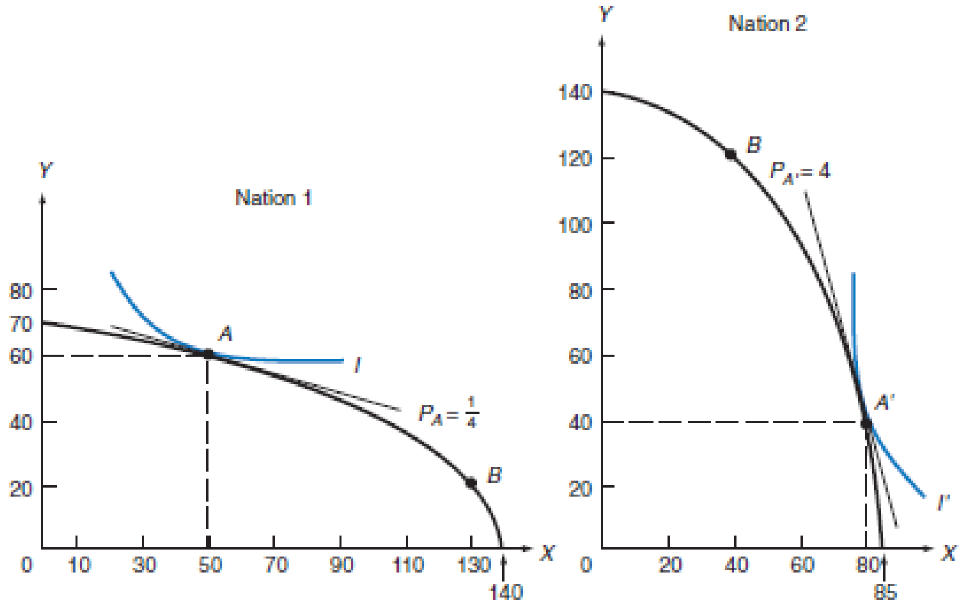
Equilibrium relative commodity price and comparative advantage

In isolation **relative prices $P_A < P_{A'}$** i.e., **Opportunity cost of X (slope of tangent) is lower** in Nation 1 than Nation 2.

Hence, Nation 1 has a comparative advantage in commodity X and Nation 2 in commodity Y.

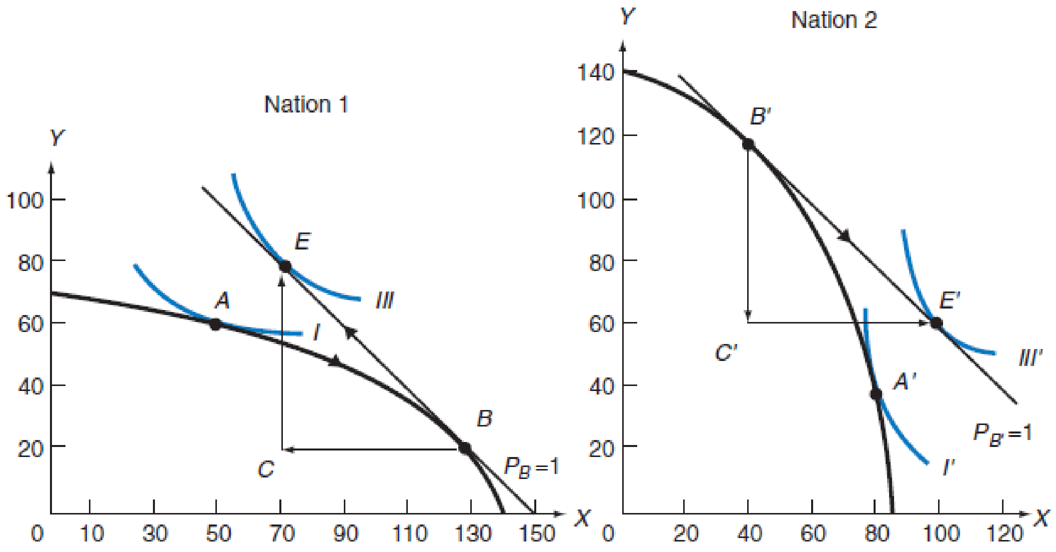
It follows that both nations can gain if Nation 1 specializes in the production and export of X in exchange for Y from Nation 2..

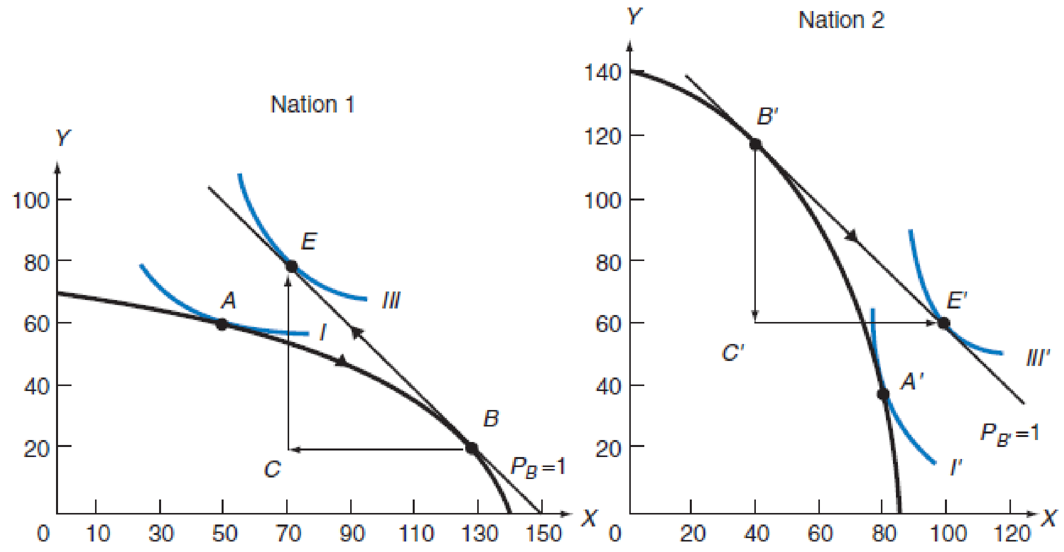
The nation with the lower relative price for a commodity has a comparative advantage in that commodity



Gains from trade

- Each nation should then specialize in the production of the commodity of its comparative advantage (i.e., produce more of the commodity than it wants to consume domestically)
- and exchange part of its output with the other nation for the commodity of its comparative disadvantage



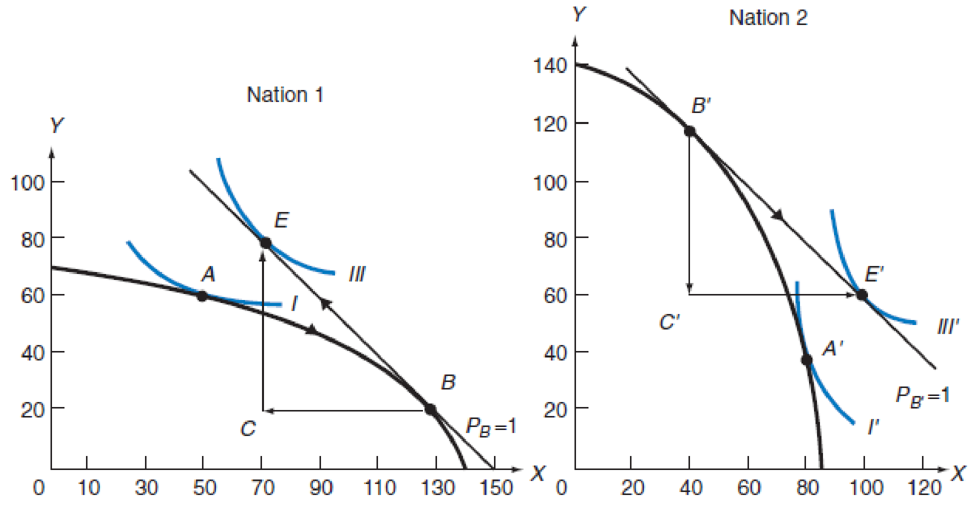


Gains from trade

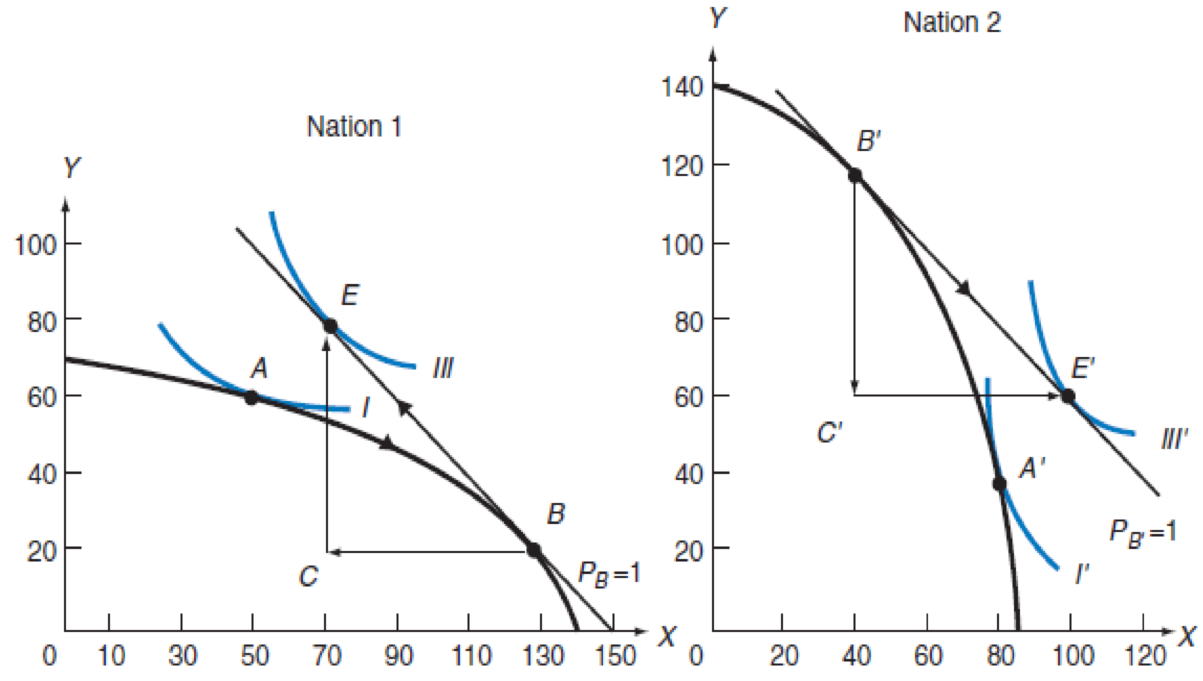
- However, as each nation specializes in producing the commodity of its comparative advantage, it incurs **increasing opportunity costs.**
- **Specialization** will continue **until relative commodity prices in the two nations become equal at the level at which trade is in equilibrium.**
- By then trading with each other, both nations end up consuming more than in the absence of trade.

Gains from trade- Example

- In the absence of trade the equilibrium-relative price of X is
- $P_A = {}^1/_4$ in Nation 1 and
- $P_{A'} = 4$ in Nation 2.
- Thus, Nation 1 has a comparative advantage in commodity X (low opportunity cost $\boldsymbol{P_A < P_{A'}}$) and Nation 2 in commodity Y.



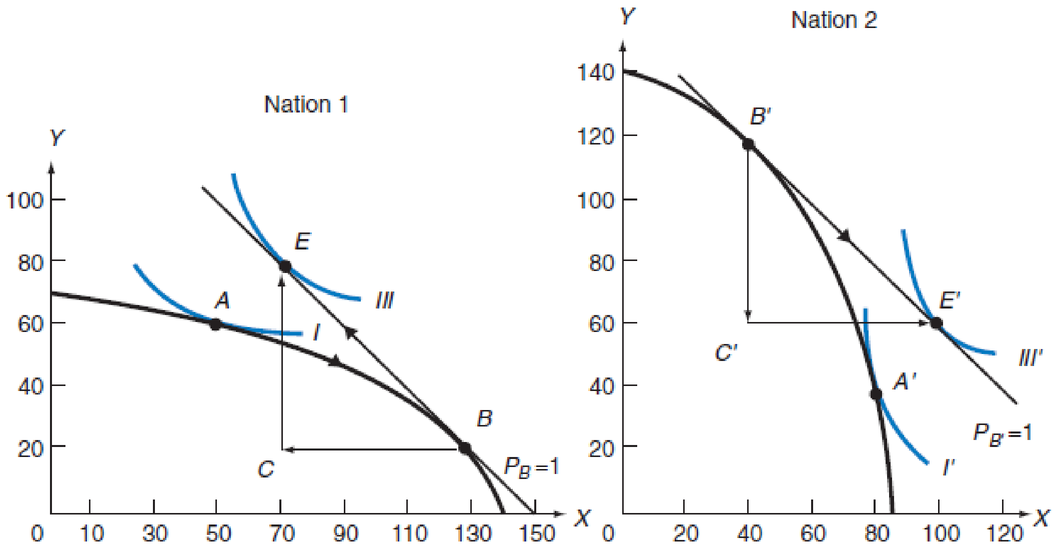
Gains from trade



- Starting from point *A* (the equilibrium point in isolation), as Nation 1 **specializes** in the **production of X** and **moves *down* its production frontier**, it incurs **increasing opportunity costs** in the production of X.
- This is reflected in the **increasing *slope*** of its production frontier.

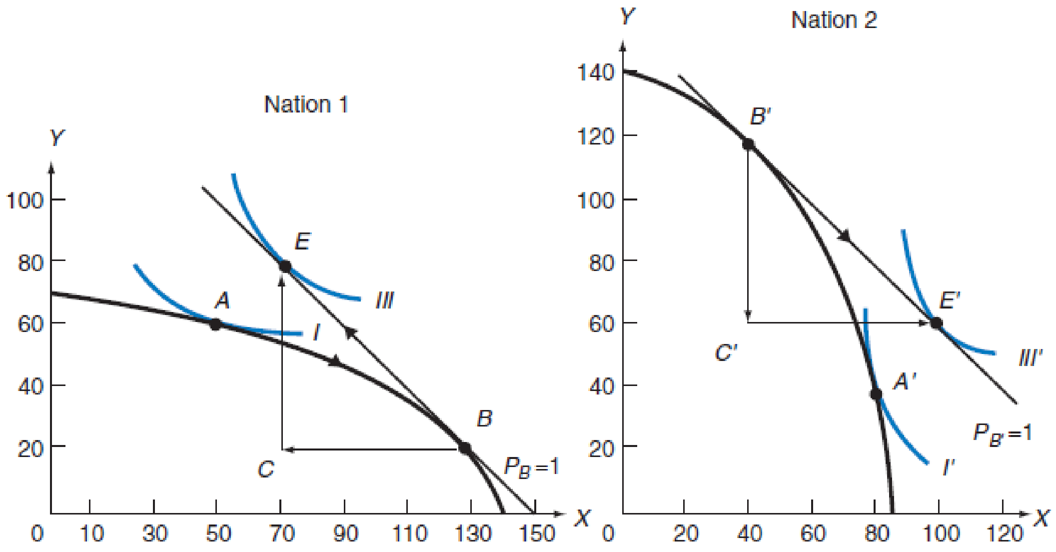
Gains from trade

- Starting from point A' as Nation 2 **specializes** in the **production of Y** and **moves *upward*** along **its production frontier**, it experiences **increasing opportunity costs in the production of Y.**
- This is reflected in the ***decline in the slope*** **of its production frontier** (a reduction in the opportunity cost of X, which means a rise in the opportunity cost of Y).



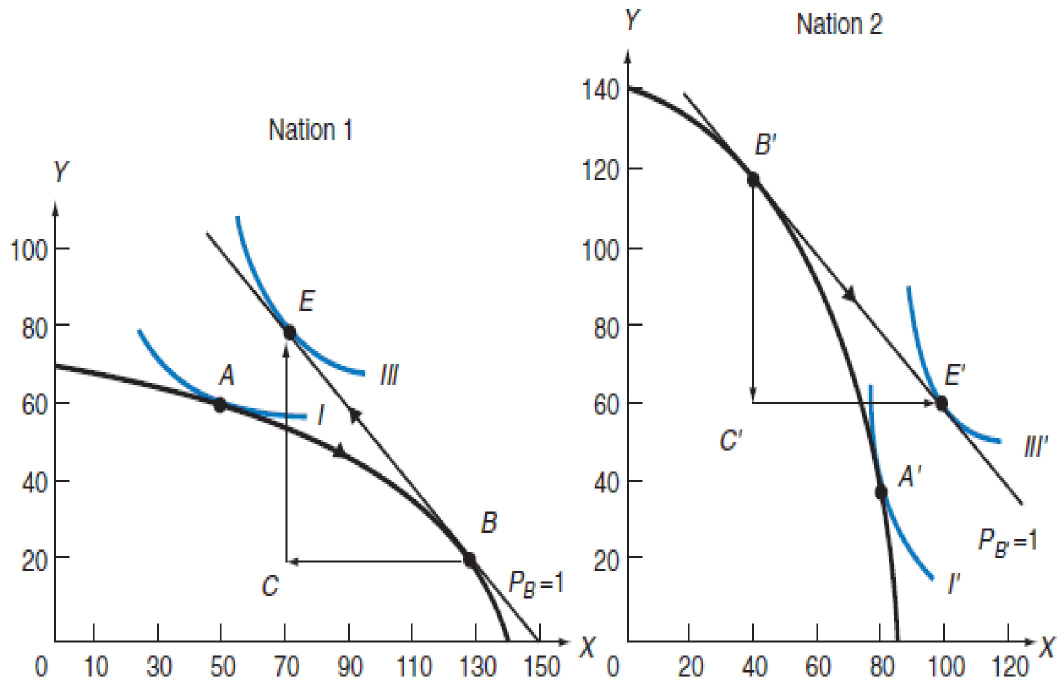
Gains from trade

- **This process of specialization in production continues until relative commodity prices (the slope of the production frontiers) become equal in the two nations.**
- The common relative price (slope) with trade will be somewhere between the pre-trade relative prices of 1/4 and 4,at the level at which trade is balanced.
- In Figure, this is $\boldsymbol{P_B = P_{B'} = 1}$



Gains from trade

- With trade, Nation 1 moves from point *A* down to point *B* in production.
- By then exchanging 60X for 60Y with Nation 2 (see trade triangle *BCE*), Nation 1 ends up consuming at point *E* (70X and 80Y) on its indifference curve III.
- This is the highest level of satisfaction that Nation 1 can reach with trade at $\boldsymbol{{}^{P_x}/_{P_Y} = 1}$.
- Thus, Nation 1 gains 20X and 20Y from its no-trade equilibrium point. (Compare point *E* on indifference curve III with point *A* on indifference curve I.)
- Line *BE* is called the *trade possibilities line* or, simply, ***trade line*** because trade takes place along this line



Gains from trade

- Similarly, Nation 2 moves from point *A* up to point *B* in production, and, by exchanging 60Y for 60X with Nation 1 (see trade triangle *BCE*), it ends up consuming at point *E* (100X and 60Y) on its indifference curve III. Thus, Nation 2 also gains 20X and 20Y from specialization in production and trade.
- Note that **with specialization in production and trade, each nation can consume outside its production frontier**