Possibilities

Unfortunatelly, this guy's t-shirt's logo isn't true, from an economic point of view …

A Key Concept: The Production Function

Inputs and Outputs

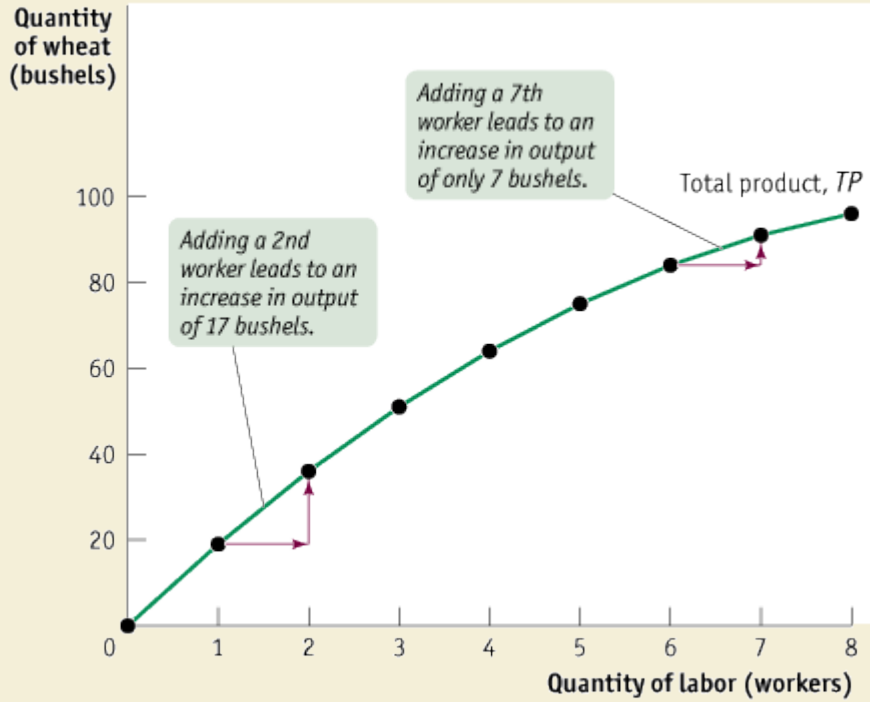
- A **production function** is the relationship between the quantity of **inputs** (**production factors**) a firm uses and the quantity of **output** (product) it produces.
- A **fixed input** or **fixed factor** is an input whose quantity is fixed and cannot be varied for a determined period of time.
- A **variable input** or **variable factor** is an input whose quantity the firm can vary.
- We will call **long-run** the time period in which all inputs can be varied. On the other hand, the **short-run** is the time period in which at least one input is fixed.

Read “The Production Function”, page 182-186, Krugman *et al.*

The Production Function

Marginal Product

Figure 7-1 Production Function and Total Product Curve for George and Martha's Farm



Quantity of labor *L* (workers)	Quantity of wheat *Q* (bushels)	Marginal product of labor *MPL* = *Q*/*L* (bushels per worker)
0	0	
		19
1	19	
		17
2	36	
		15
3	51	
		13
4	64	
		11
5	75	
		9
6	84	
		7
7	91	
		5
8	96	

The table shows the production function, the relationship between the quantity of the variable input (labor, measured in number of workers) and the quantity of output (bushels of wheat) for a given quantity of the fixed input. It also calculates the marginal product of labor on George and Martha's farm. The total product curve shows the production function graphically. It slopes upward because more wheat is produced as more workers are employed. It also becomes flatter because the marginal product of labor declines as more and more workers are employed.

Efficiency

Efficiency in Production (1)

• A **production technique** is a way of combining inputs to produce an output.

• ***Example 1:*** Technique A:10 workers and 50 tools give 120 Ys.
Technique B: 20 workers and 15 tools give 100 Ys.
Technique C:10 workers and 48 tools give 122 Ys.

• A **production technique is efficient** if there is no way to produce more of an output by saving of one factor and without using more of the other.

• ***Example 2:*** Which of the previous techniques is/are efficient?

• The collection of all the efficient techniques is the **technology**.

Efficiency

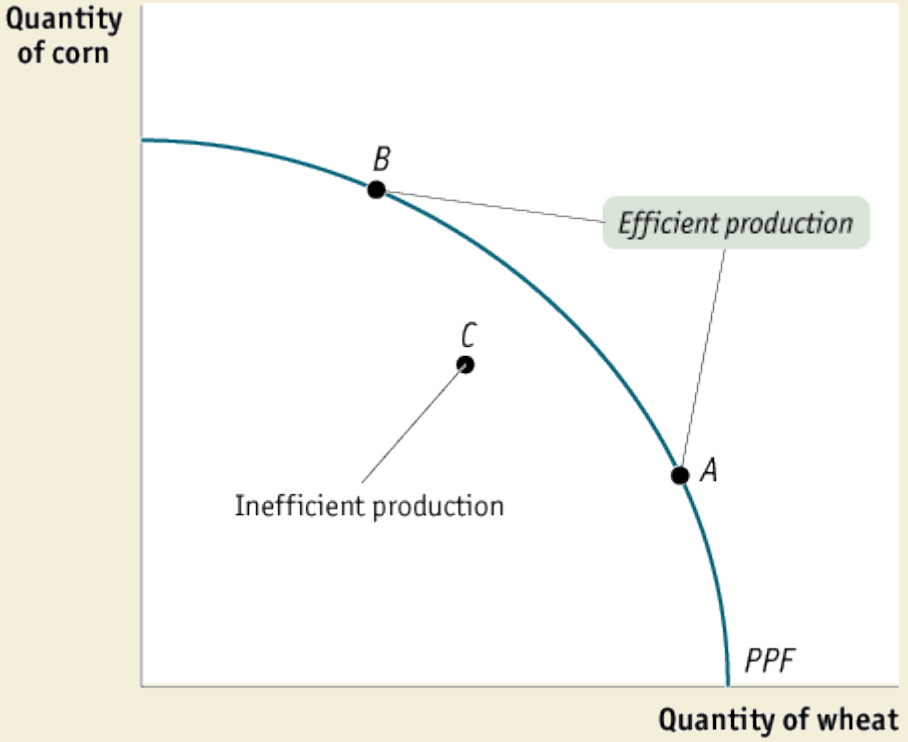
Efficiency in Production (2)

• An economy is **efficient in production** if there is no way to produce more of some goods without producing less of other goods.

Figure 10-1

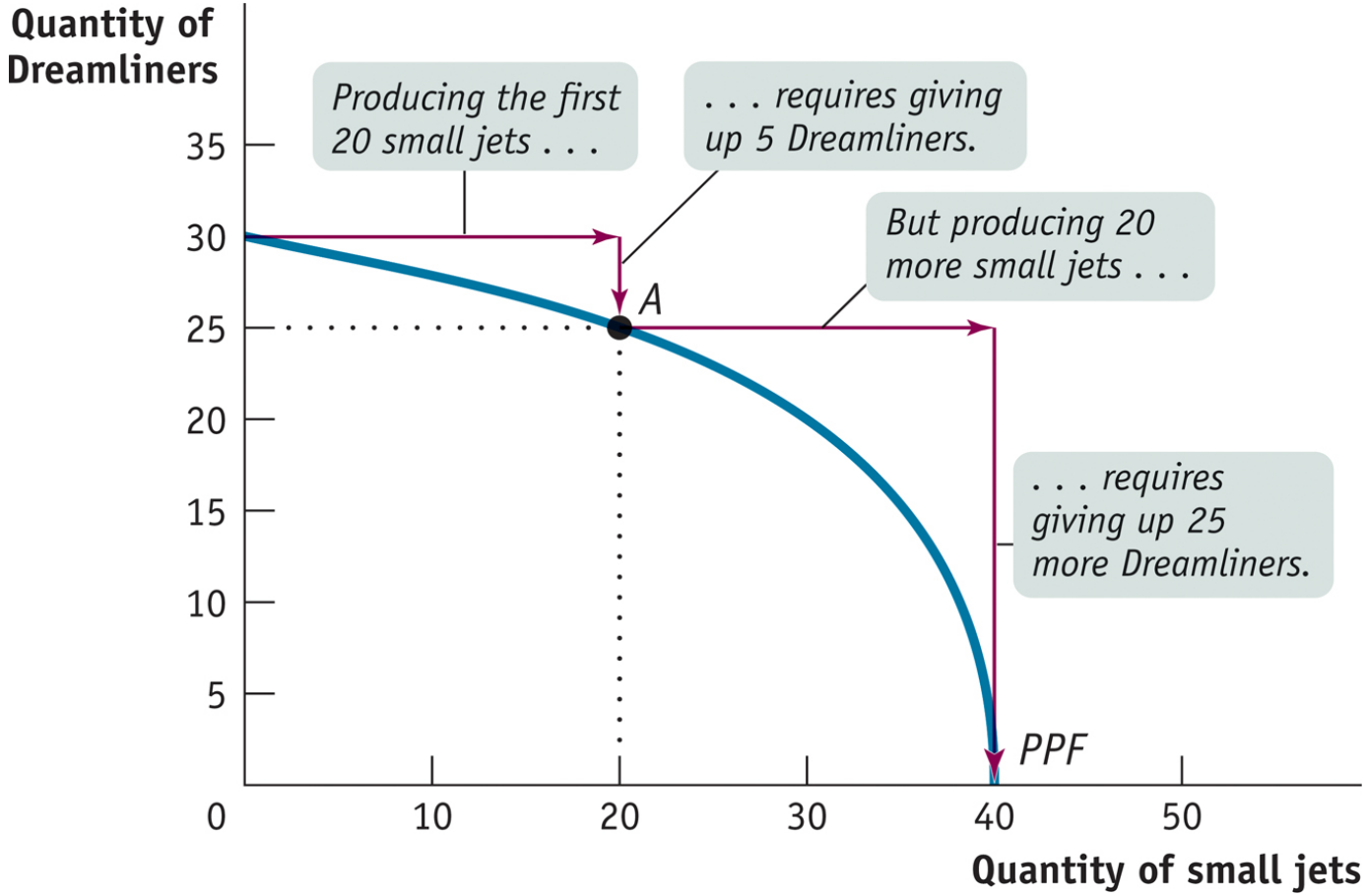
The Production Possibility Frontier and Efficiency in Production

An economy is efficient in production if it cannot produce more of one good without producing less of other goods. Equivalently, an economy is efficient in production if it is on its production possibility frontier. Here *A* and *B* are efficient production points—at each point the economy can produce more of one good only by producing less of the other. *C* is not an efficient production point because more corn *and* more wheat can be produced.



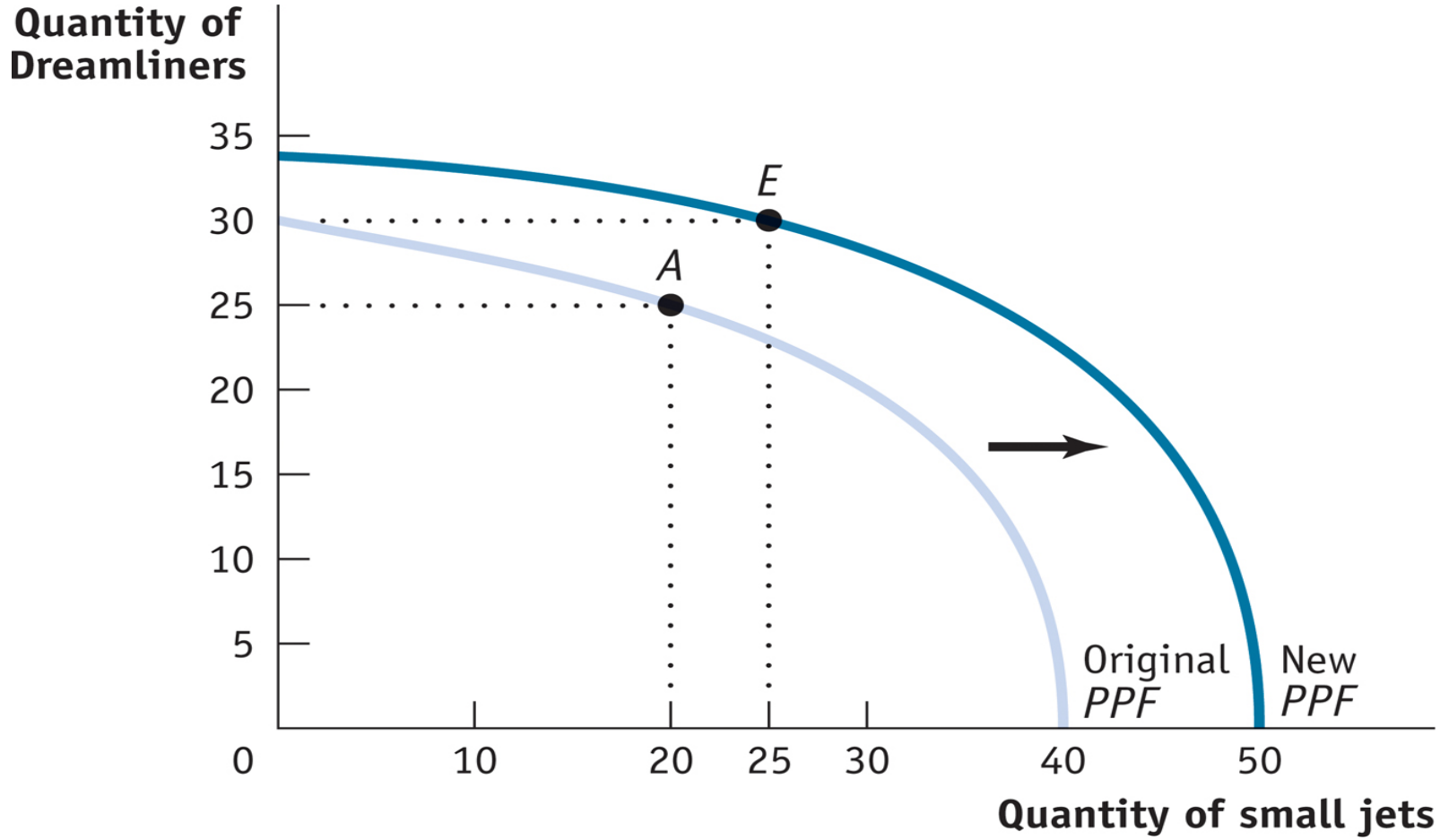
Production Possibility Frontier (PPF)

Increasing Opportunity Cost



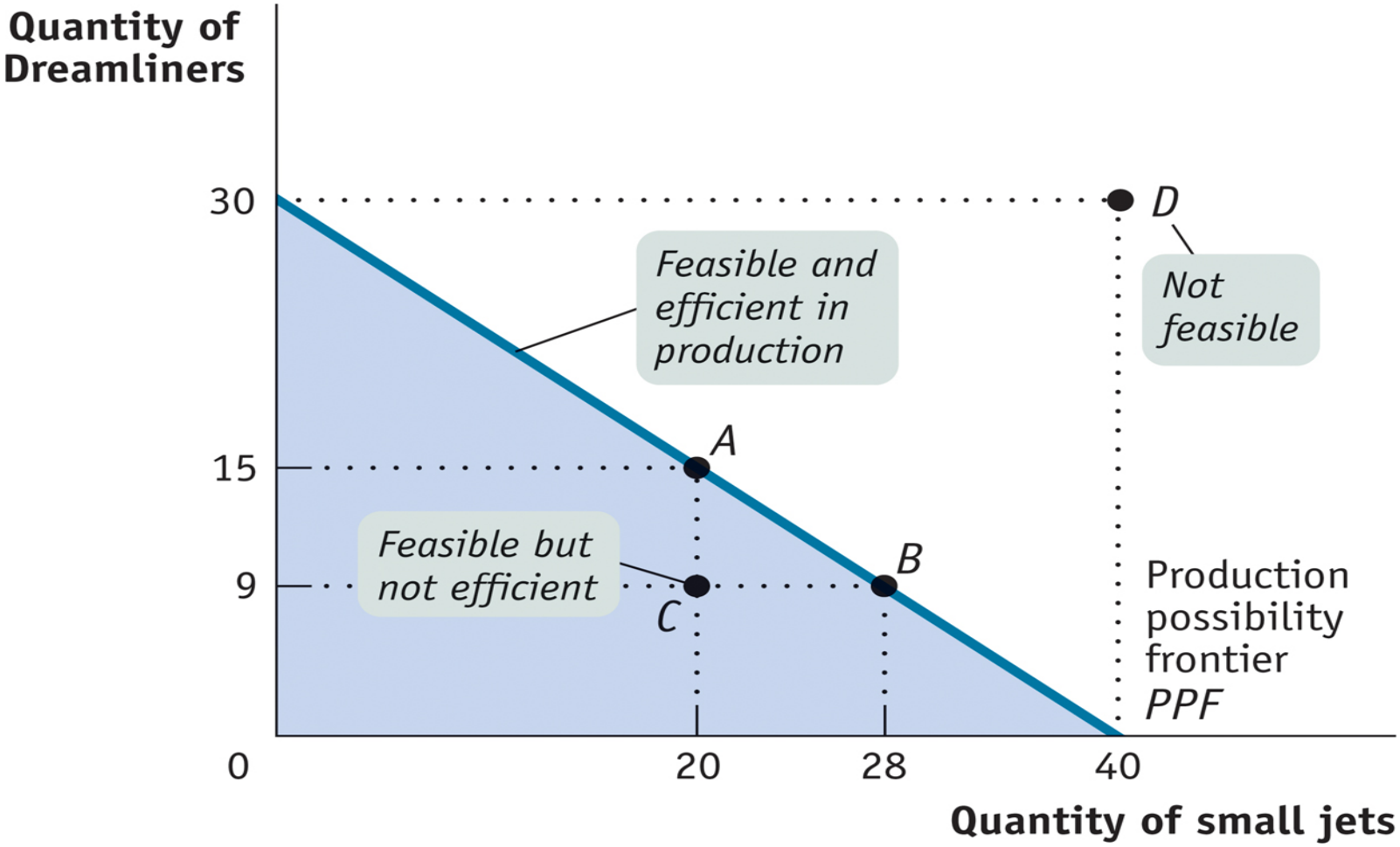
Production Possibility Frontier (PPF)

Economic Growth



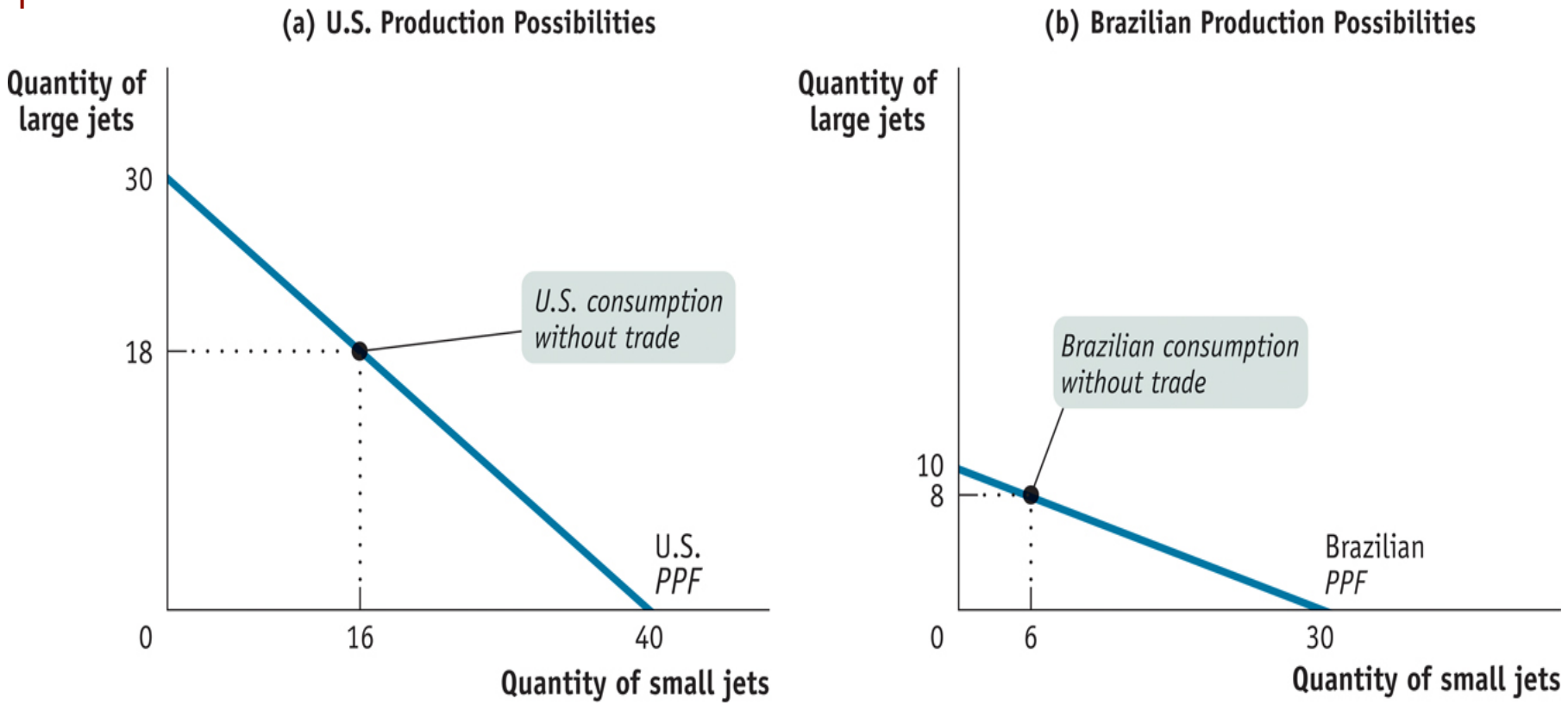
Production Possibility Frontier (PPF)

Constant Opportunity Cost



Specialization and Trade: USA vs Brazil

Constant Opportunity Costs



USA and Brazilian Opportunity Costs

TABLE 2-1 U.S. and Brazilian Opportunity Costs of Small Jets and Large Jets

	U.S. Opportunity Cost		Brazilian Opportunity Cost
One small jet	¾ large jet	>	⅓ large jet
One large jet	4/3 small jets	<	3 small jets

How USA and Brazil Gain from Trade after Specialization?

TABLE 2-2 How the United States and Brazil Gain from Trade

		Without Trade		With Trade		Gains from Trade
		Production	Consumption	Production	Consumption	
United States	Large jets	18	18	30	20	+2
	Small jets	16	16	0	20	+4
Brazil	Large jets	8	8	0	10	+2
	Small jets	6	6	30	10	+4

Explanation of Gains from Trade

Specialization and Trade

- Two countries are better off when each **specializes in what they are good at and then trade** with each other.

- It is a good idea for the United States to make large jets for both of them, because their opportunity cost of a large jet in terms of small jet is only 4/3 of a small jet versus 3 for Brazil.

Explanation of Gains from Trade

Absolute vs. Comparative (relative)

- The United States has an absolute advantage in both activities. The United States can produce more output with a given amount of input than Brazil.
- But the United States can indeed benefit from a deal with Brazil because *comparative*, not *absolute*, advantage is the basis for mutual gain.
- So Brazil, despite its *absolute disadvantage*, even *in small jets*, has a *comparative advantage in small jets*.
- Meanwhile the United States, which can use its time better by making large jets, *has a comparative disadvantage in small jets*.

Efficiency

Efficiency in Consumption-Distribution

• An economy is **efficient in consumption** if there is no way to redistribute goods among consumers that makes some consumers better off without making others worse off.

• ***Example 1:*** John only likes apples whereas Kate only likes pears. There are 2 apples and 3 pears. Find an efficient-in-consumption distribution.

• ***Example 2:*** Now imagine John likes pears as well. Find several efficient-in-consumption distributions.

Read “Efficiency”, page 29, Krugman *et al.*

KEY TERMS

- Production function
- Fixed input
- Variable input
- Long-run
- Short-run
- Production Possibility Frontier (PPF)
- Technique
- Technology
- Gains from Trade
- Specialization
- Absolute and Comparative Advantage
- Efficiency
  - in production
  - in consumption/distribution