

# ECO2011 Basic Microeconomics

Mankiw Chapter 3 (Comparative advantage)

2023

# Interdependence

- Every day you rely on many people from around the world, most of whom you've never met, to provide you with the goods and services you enjoy.

hair gel from  
U.S.A.

cell phone  
from China

dress shirt  
from  
Indonesia

coffee from  
Kenya



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# Interdependence

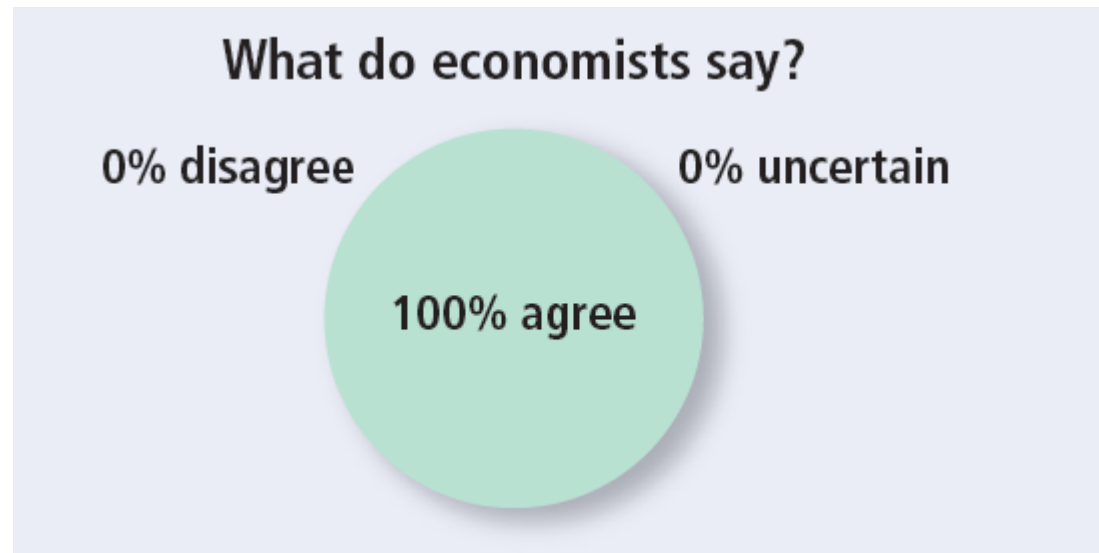
- “Trade can make everyone better off”
  - One of the Ten Principles from Chapter 1
  - We now learn why people – and nations – choose to be interdependent
  - And how they can gain from trade



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# Case: Trade between China and the United States

- “Trade with China makes most Americans better off because, among other advantages, they can buy goods that are made or assembled more cheaply in China.”



# Production Possibilities Frontier

- The Production Possibilities Frontier (PPF): A graph that shows the combinations of two goods the economy can possibly produce given the available resources and the available technology.
  - Is PPF a positive or normative tool?
- Example:
  - Two goods: computers and wheat
  - One resource: labor (measured in hours)
  - Economy has 50,000 labor hours per month available for production

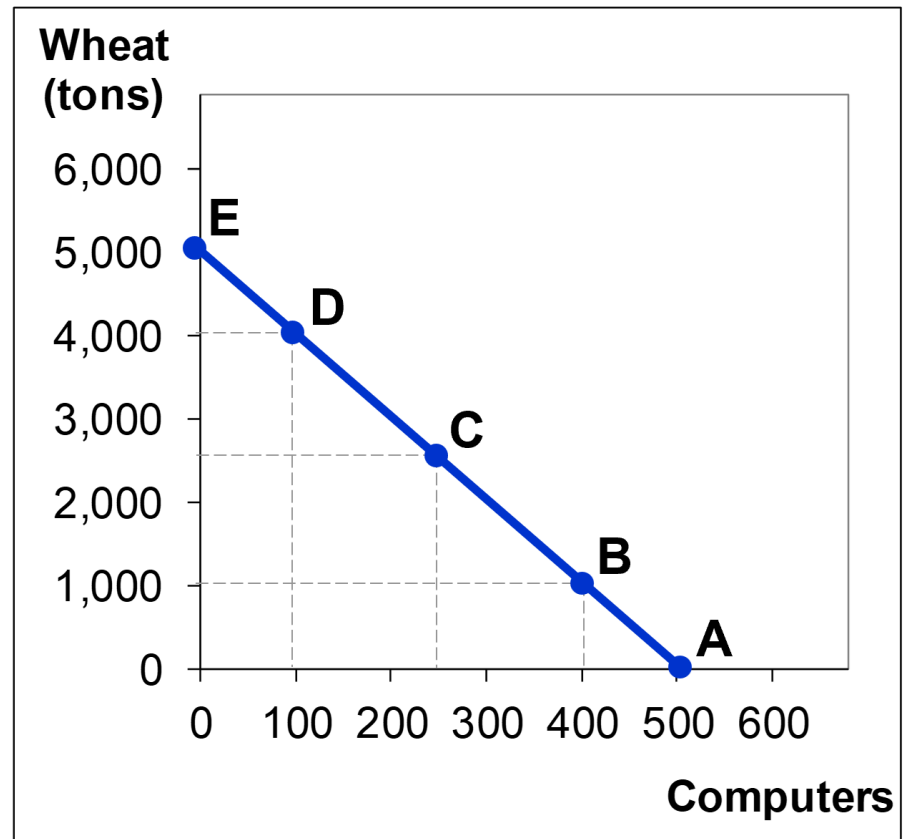
# PPF Example

- Producing one computer requires 100 hours labor.
- Producing one ton of wheat requires 10 hours labor.

	Employment of labor hours		Production	
	Computers	Wheat	Computers	Wheat
A	50,000	0	500	0
B	40,000	10,000	400	1,000
C	25,000	25,000	250	2,500
D	10,000	40,000	100	4,000
E	0	50,000	0	5,000

# PPF Example

Point on graph	Production	
	Com- puters	Wheat
A	500	0
B	400	1,000
C	250	2,500
D	100	4,000
E	0	5,000



On the graph above, find the point that represents (100 computers, 3000 tons of wheat), label it **F**.

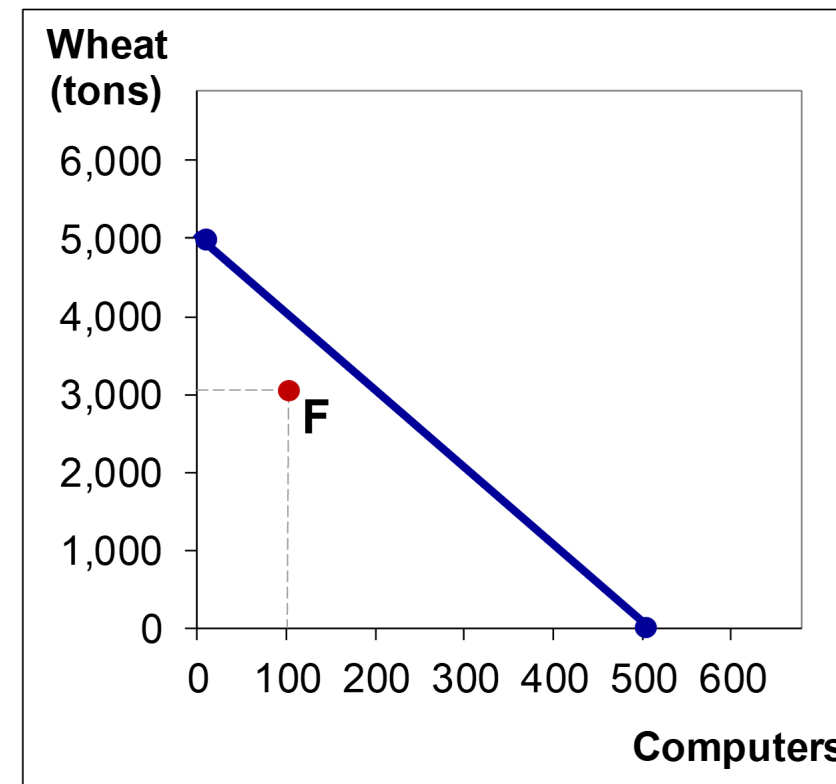
- Would it be possible for the economy to produce this combination of the two goods? Why or why not?

Next, find the point that represents (300 computers, 3500 tons of wheat), label it **G**.

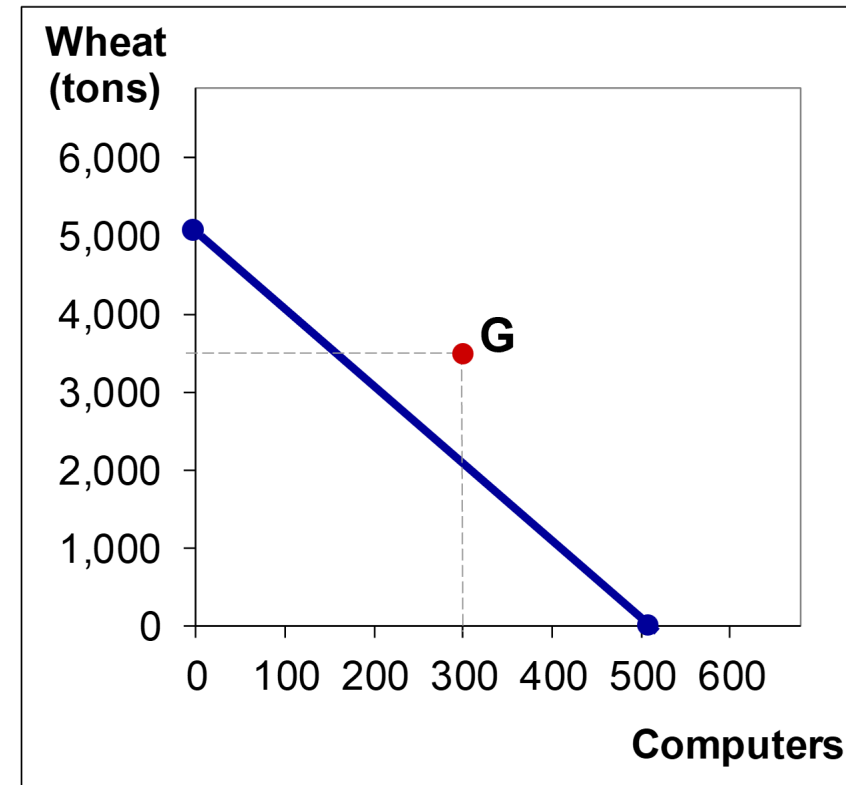
- Would it be possible for the economy to produce this combination of the two goods?



- **Point F:** 100 computers, 3000 tons wheat
- Requires 40,000 hours of labor
- Possible but not efficient: could get more of either good without sacrificing any of the other



- **Point G:** 300 computers, 3500 tons wheat
- Requires 65,000 hours of labor.
- Not possible because the economy only has 50,000 hours



# The PPF: What We Know So Far

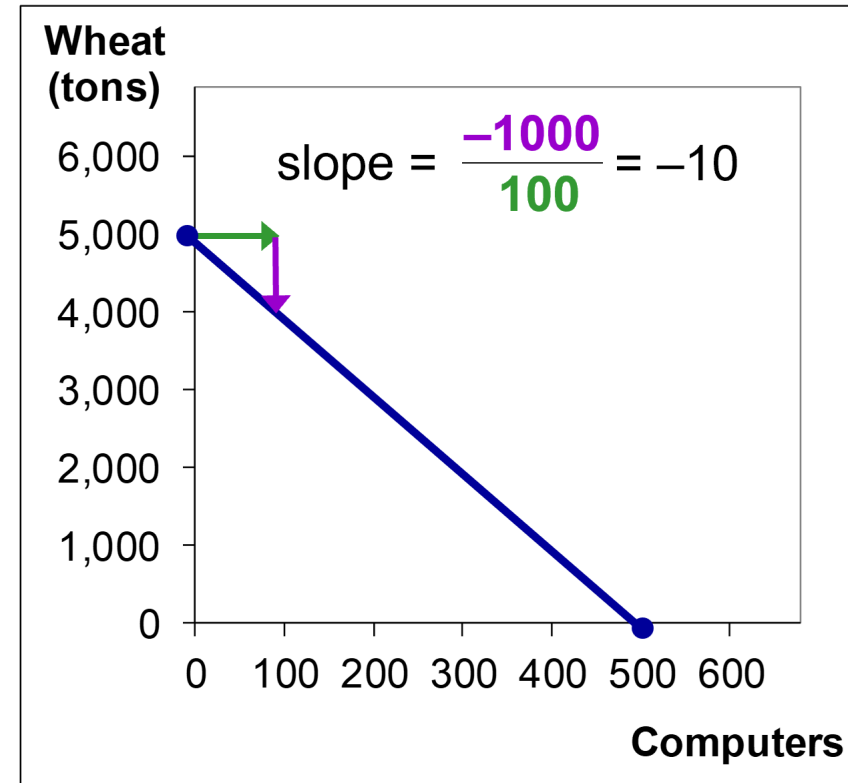
- Points on the PPF (like A – E):
  - Possible/attainable
  - Efficient: all resources are fully utilized
- Points under the PPF (like F):
  - Possible/attainable
  - Inefficient: some resources are underutilized (e.g., workers unemployed, factories idle)
- Points above the PPF (like G)
  - Not possible/unattainable

# The PPF

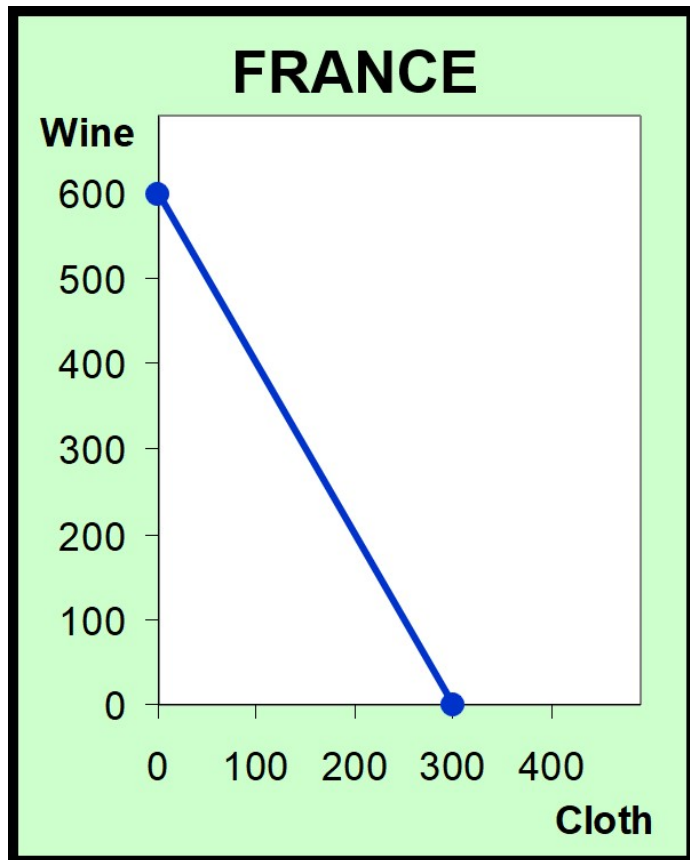
- Moving along a PPF
  - Involves shifting resources from the production of one good to the other
- Society faces a tradeoff
  - Getting more of one good requires sacrificing some of the other
- The slope of the PPF
  - The opportunity cost of one good in terms of the other

# The PPF and Opportunity Cost

- The slope of a line equals the “**rise** over the **run**.”
- **Opportunity cost** of 1 computer = 10 tons of wheat.



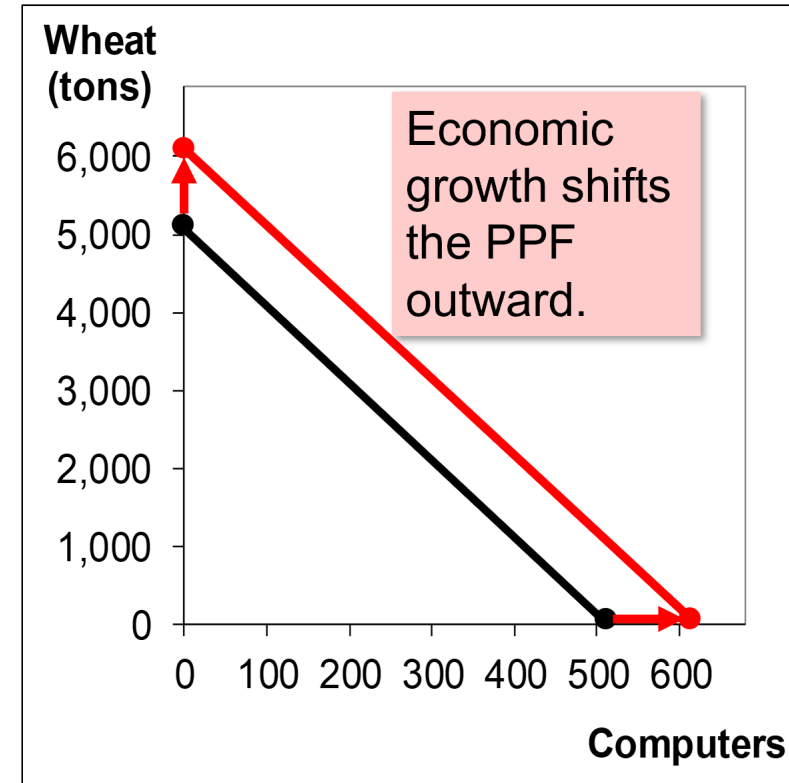
In which country is the opportunity cost of cloth lower?



England, because its PPF is not as steep as France's

# Economic Growth and the PPF

- With additional resources or an improvement in technology, the economy can produce more computers, more wheat, or any combination in between.





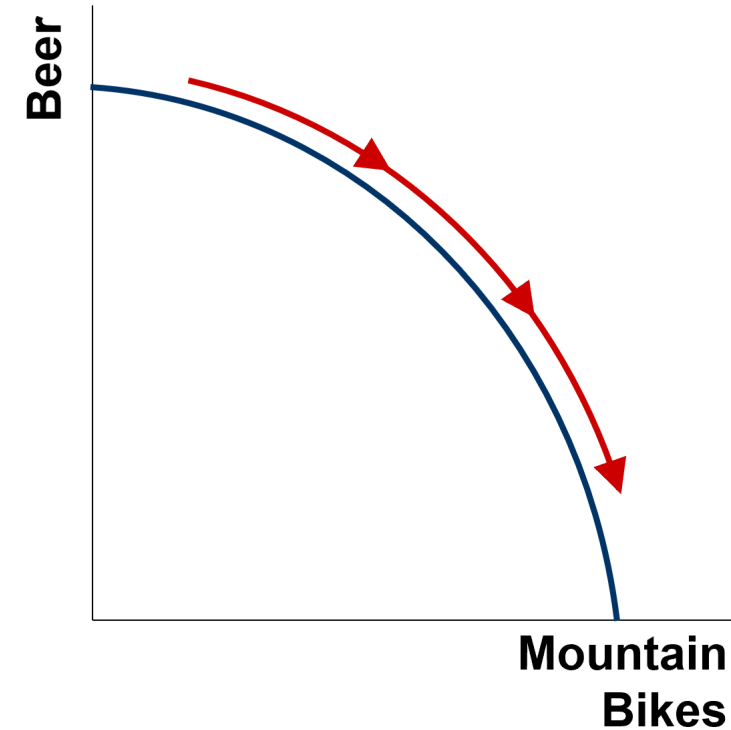
# The Shape of the PPF

- The PPF could be a straight line, or bow-shaped
- Depends on what happens to opportunity cost as economy shifts resources from one industry to the other.
  - If opp. cost remains constant, PPF is a straight line. (In the previous example, opp. cost of a computer was always 10 tons of wheat.)
  - If opp. cost of a good rises as the economy produces more of the good, PPF is bow-shaped.

# Why the PPF Might Be Bowled Outward

- As the economy shifts resources from beer to mountain bikes:

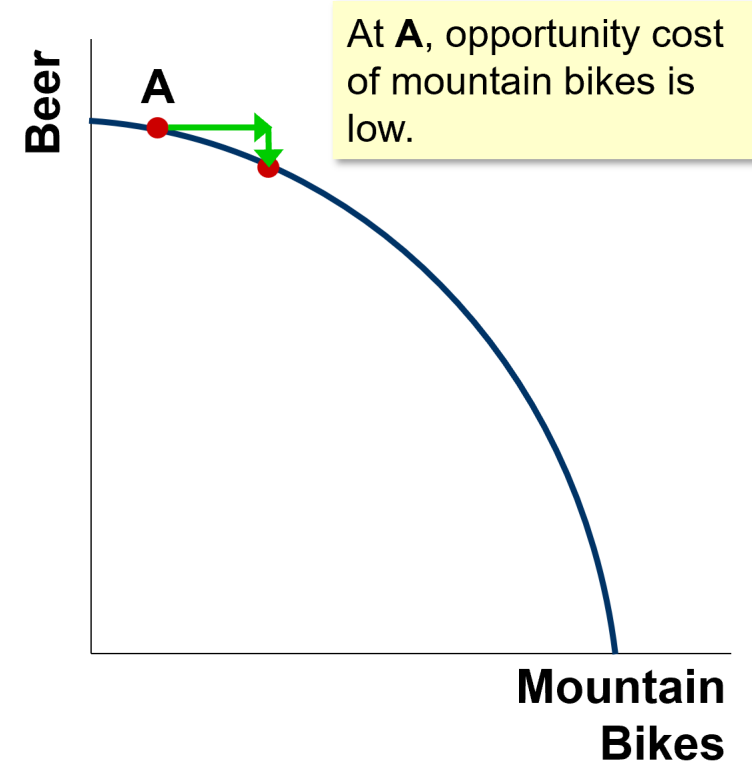
PPF becomes steeper and the opportunity cost of mountain bikes increases.



# Why the PPF Might Be Bowled Outward

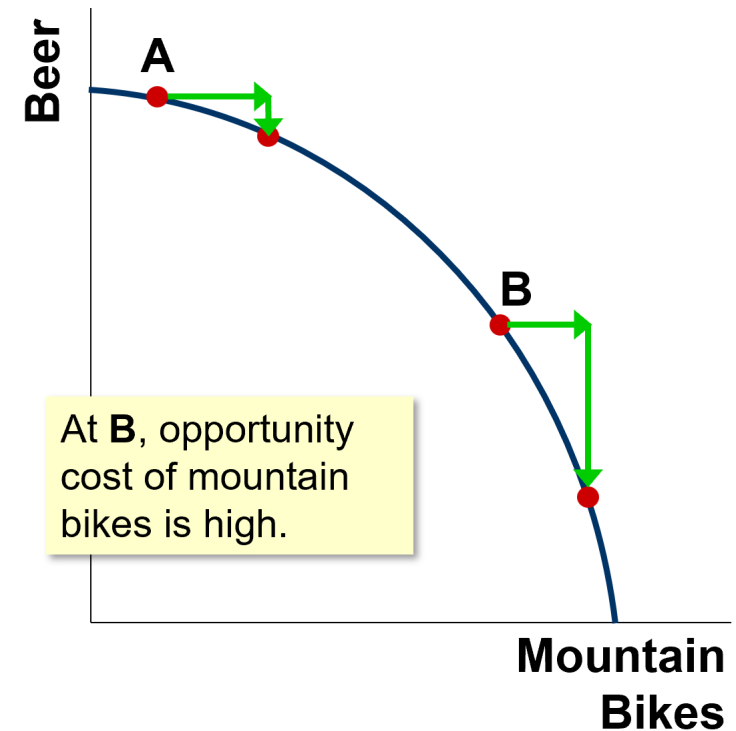
- At point A, most workers are producing beer, even those who are better suited to building bikes.

So, do not have to give up much beer to get more bikes.



# Why the PPF Might Be Bowled Outward

- At B, most workers are producing bikes. The few left in beer production are the best brewers.
- Producing more bikes would require shifting some of the best brewers away from beer production causing a big drop in beer output.



# Why the PPF Might Be Bowed Outward

- The PPF is bowed outward when:
  - Different workers have different skills, different opportunity costs of producing one good in terms of the other
  - There is some other resource, or mix of resources with varying opportunity costs
    - E.g., different types of land suited for different uses

# Apply What We Have Learned

- Draw a PPF for a society that produces food and clothing
- Show an efficient point, an inefficient point, and an infeasible point
- Show the effects of a drought

# Comparative Advantage and Trades: Example 1

- Two countries:
  - The U.S. and Japan
- Two goods:
  - Computers and wheat
- One resource:
  - Labor, measured in hours
- How much of both goods each country produces and consumes
  - If the country chooses to be self-sufficient
  - If it trades with the other country



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# Comparative Advantage and Trades: Example 1

- Production Possibilities in the U.S.
  - The U.S. has 50,000 hours of labor available for production, per month
  - Producing one computer requires 100 hours of labor
  - Producing one ton of wheat requires 10 hours of labor



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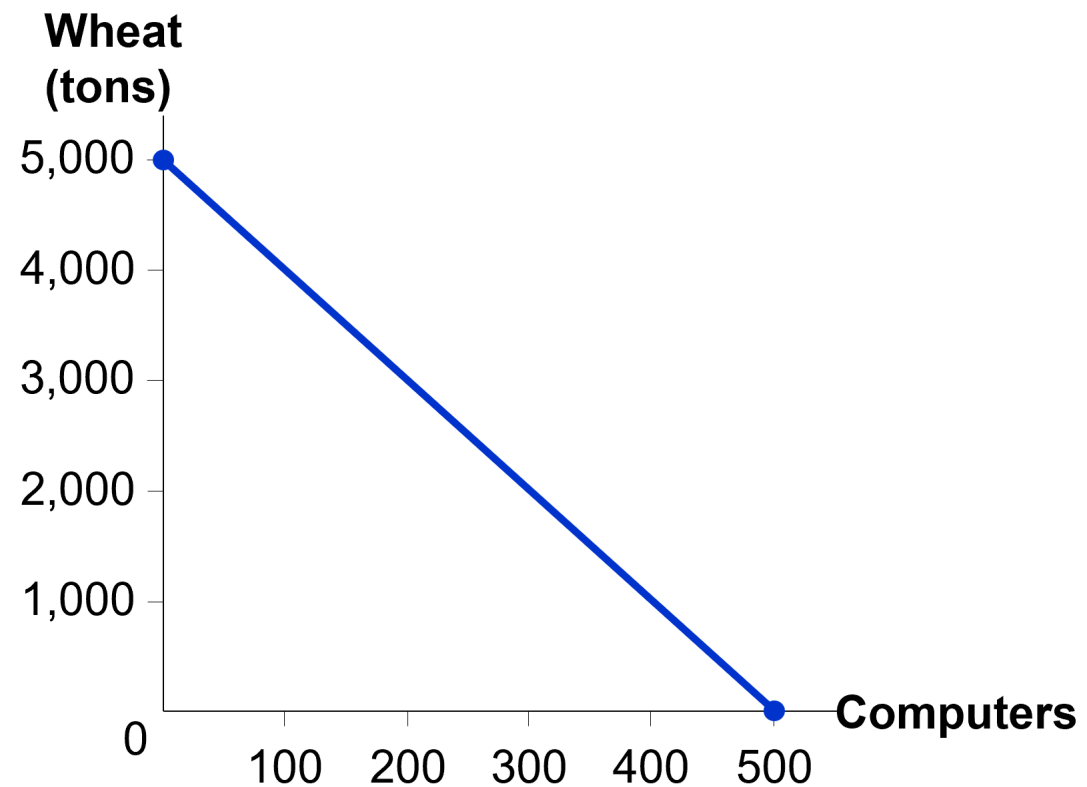


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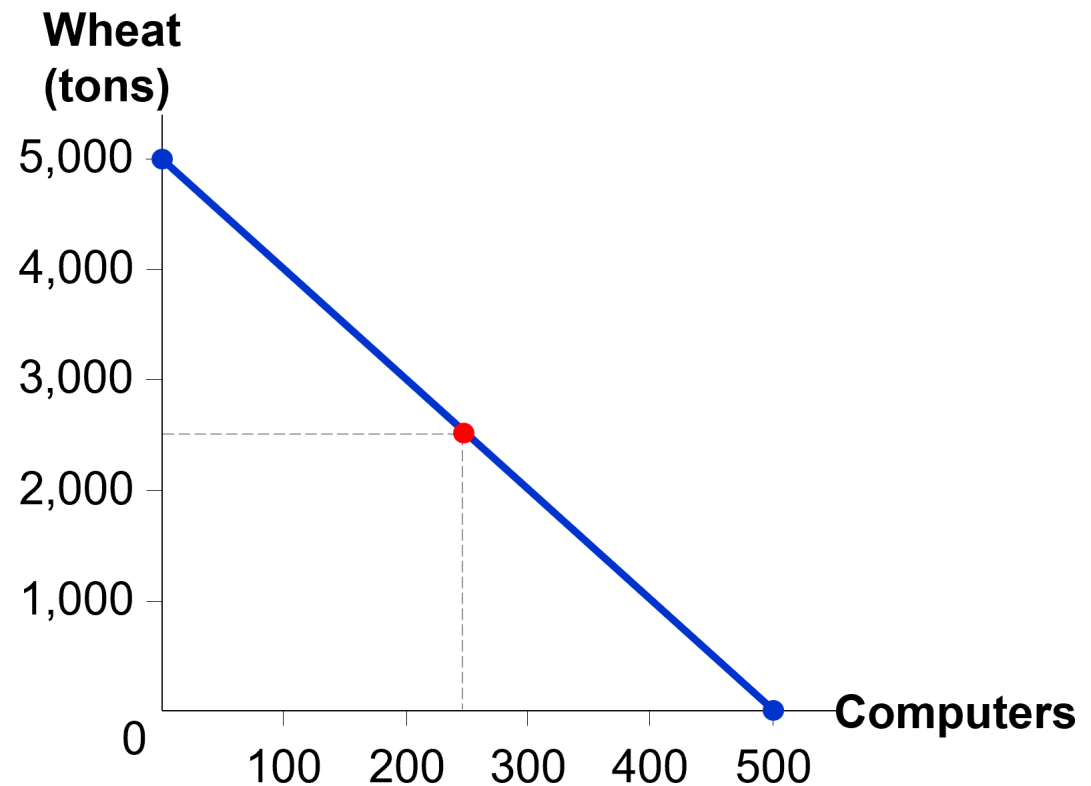
# The U.S. PPF

- The U.S. has enough labor to produce 500 computers, or 5,000 tons of wheat, or any combination along the PPF.



# The U.S. PPF

- Suppose the U.S. uses half its labor to produce each of the two goods. Then it will produce and consume 250 computers and 2,500 tons of wheat.



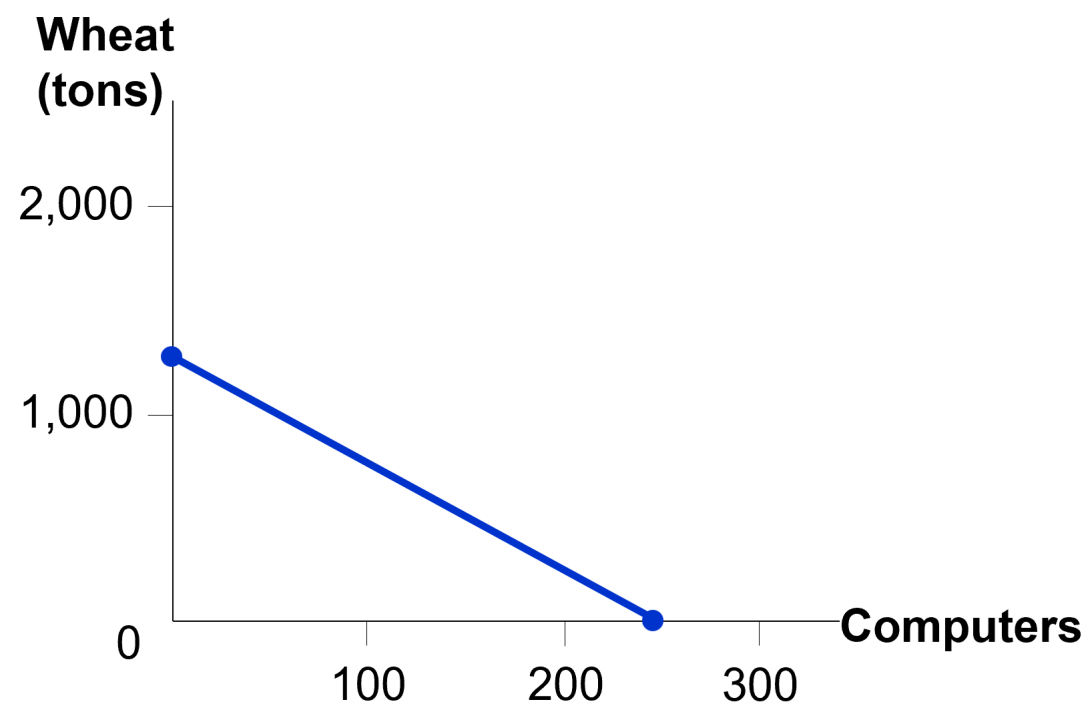
Use the following information to draw Japan's PPF.

- Japan has 30,000 hours of labor available for production, per month.
- Producing one computer requires 125 hours of labor.
- Producing one ton of wheat requires 25 hours of labor.
- Your graph should measure computers on the horizontal axis.

# Active Learning

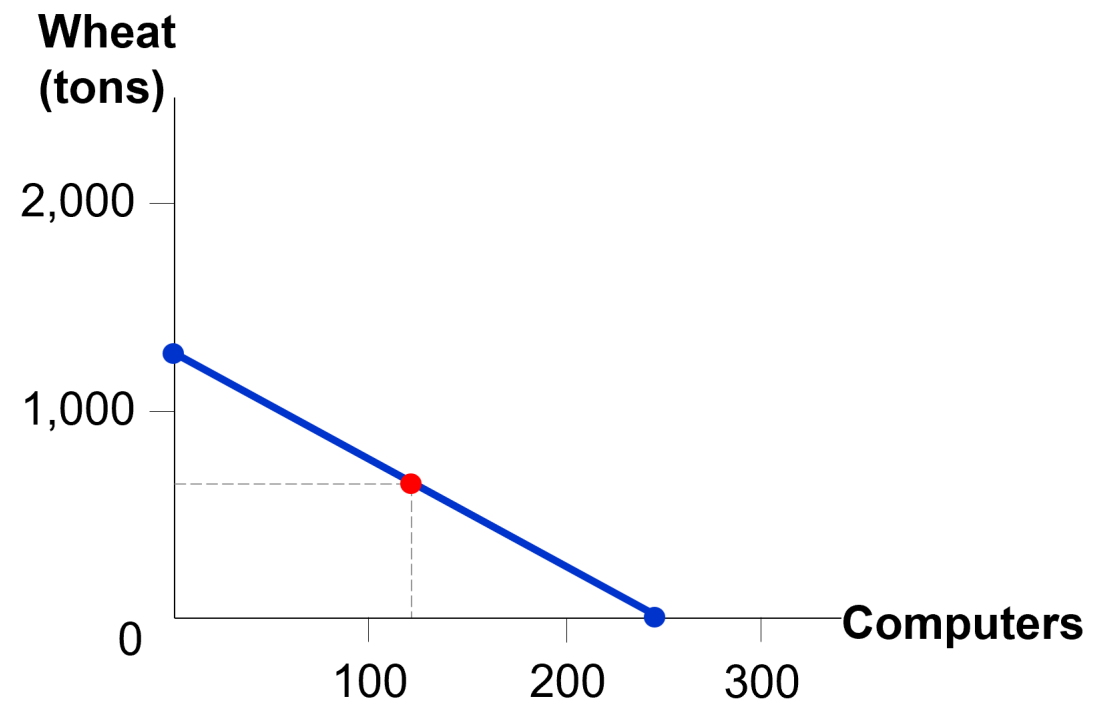
## Japan's PPF

- Japan has enough labor to produce 240 computers, or 1,200 tons of wheat, or any combination along the PPF.



# Japan Without Trade

- Suppose Japan uses half its labor to produce each good.
- Then it will produce and consume 120 computers and 600 tons of wheat.



# Consumption With and Without Trade

- Without trade:
  - U.S. consumers get 250 computers and 2500 tons wheat
  - Japanese consumers get 120 computers and 600 tons wheat
- Comparison
  - Consumption without trade vs. consumption with trade
  - We need to see how much of each good is produced and traded by the two countries

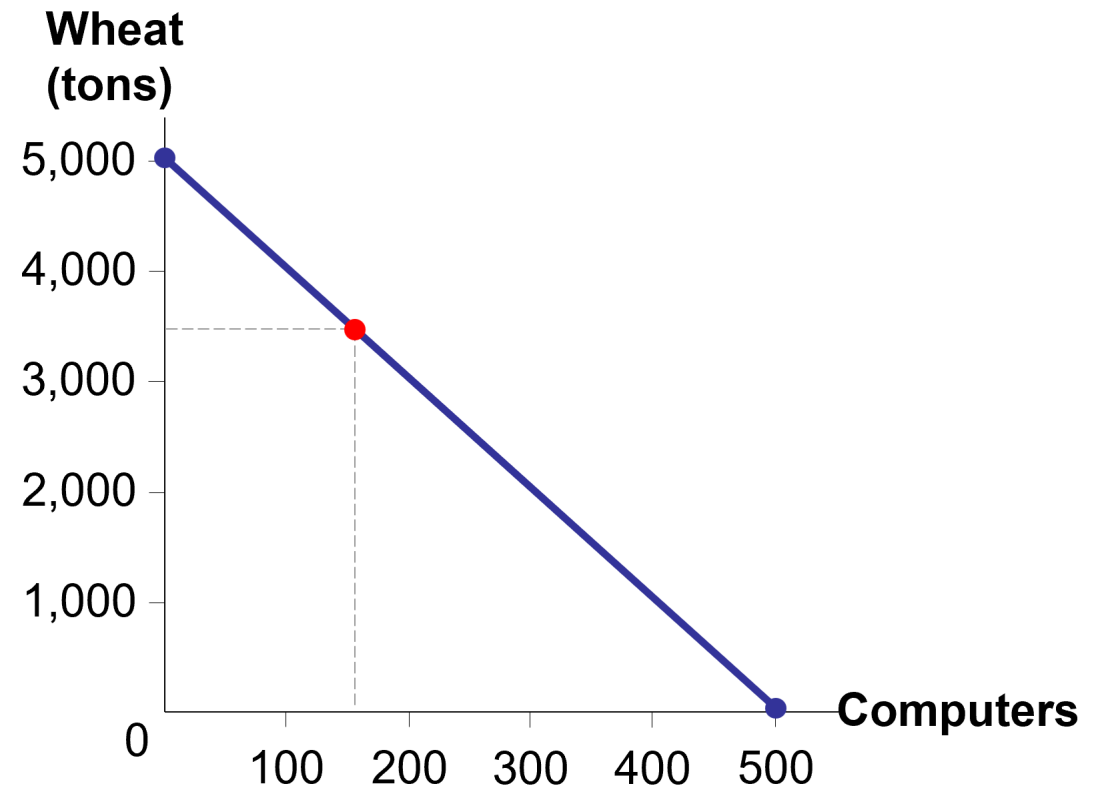
**A.** Suppose the U.S. produces 3400 tons of wheat.

- How many computers would the U.S. be able to produce with its remaining labor?
- Draw the point representing this combination of computers and wheat on the U.S. PPF.

**B.** Suppose Japan produces 240 computers.

- How many tons of wheat would Japan be able to produce with its remaining labor?
- Draw this point on Japan's PPF.

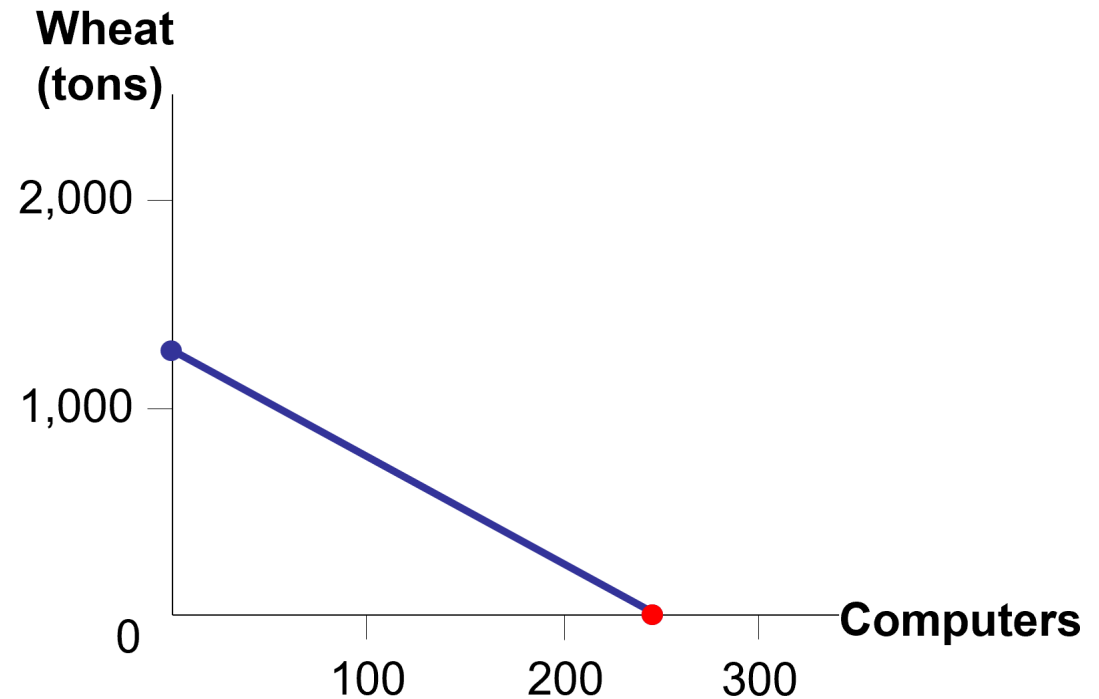
- Producing 3,400 tons of wheat requires 34,000 labor hours.
- The remaining 16,000 labor hours are used to produce 160 computers.





# Active Learning Japan's Production with trade

- Producing 240 computers requires all of Japan's 30,000 labor hours.
- So, Japan would produce 0 tons of wheat.



# Exports and Imports

- Imports
  - Goods produced abroad and sold domestically
- Exports
  - Goods produced domestically and sold abroad

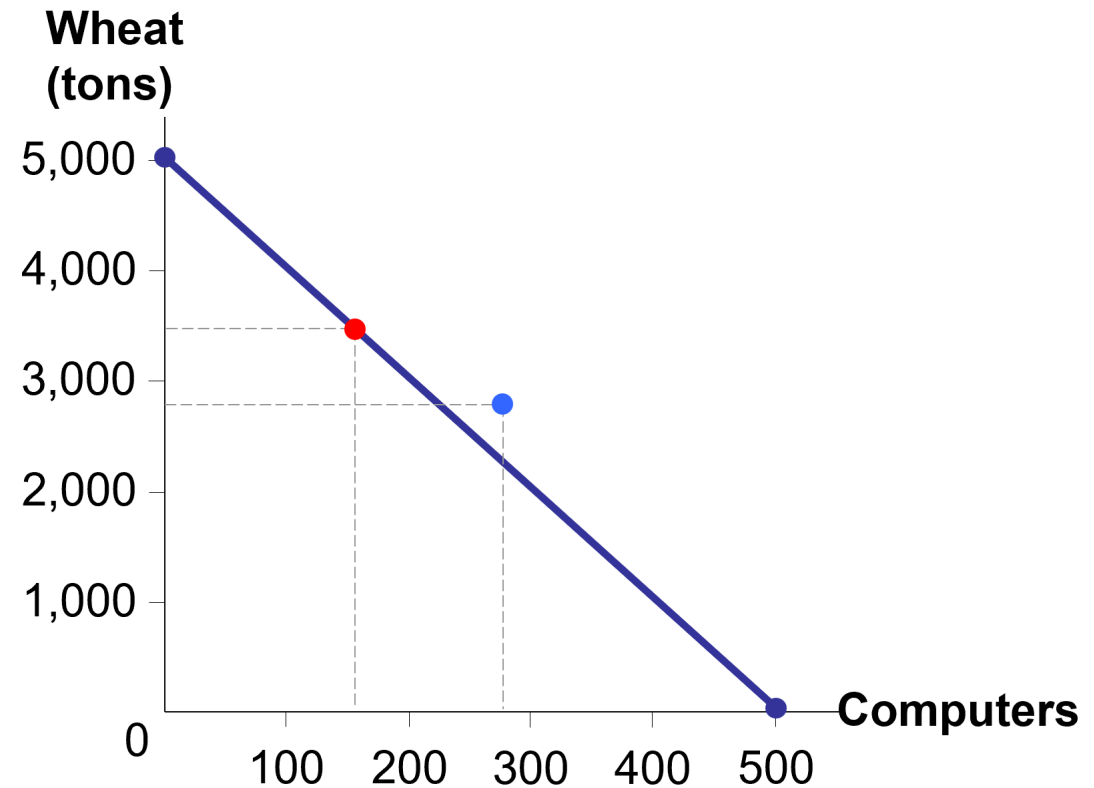
Suppose the U.S. exports 700 tons of wheat to Japan, and imports 110 computers from Japan. (Japan imports 700 tons wheat and exports 110 computers.)

- A. How much of each good is consumed in the U.S.? Plot this combination on the U.S. PPF.
- B. How much of each good is consumed in Japan? Plot this combination on Japan's PPF.

# Active Learning

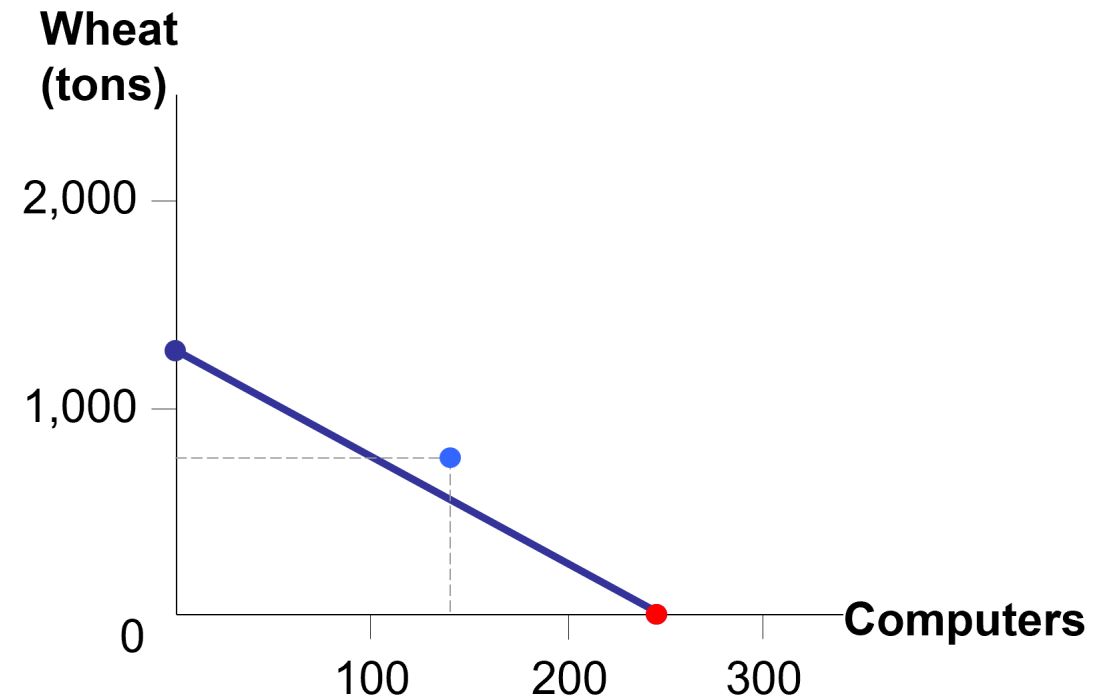
## U.S. Consumption with trade

	computers	wheat
produced	160	3400
+ imported	110	0
– exported	0	700
= amount consumed	270	2700



# Active Learning Japan's Consumption with trade

	computers	wheat
produced	240	0
+ imported	0	700
– exported	110	0
= amount consumed	130	700



# Trade Makes Both Countries Better Off

U.S.			
	consumption without trade	consumption with trade	gains from trade
computers	250	270	20
wheat	2500	2700	200
Japan			
	consumption without trade	consumption with trade	gains from trade
computers	120	130	10
wheat	600	700	100

# Where Do These Gains Come From?

- Absolute advantage:
  - The ability to produce a good using fewer inputs than another producer
  - The U.S. has absolute advantage in wheat
    - Producing a ton of wheat uses 10 labor hours in the U.S. vs. 25 in Japan
  - The U.S. has absolute advantage in computers
    - Producing one computer requires 125 labor hours in Japan, but only 100 in the U.S.



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# Where Do These Gains Come From?

- The U.S. has an absolute advantage in both goods!
  - So why does Japan specialize in computers?
  - Why do both countries gain from trade?
- Two countries can gain from trade
  - When each specializes in the good it produces at lowest cost



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# Two Measures of the Cost of a Good

- Absolute advantage
  - Measures the cost of a good in terms of the inputs required to produce it
- Another measure of cost: opportunity cost
  - In our example, the opportunity cost of a computer is the amount of wheat that could be produced using the labor needed to produce one computer.



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# Comparative Advantage

- Comparative advantage
  - The ability to produce a good at a lower opportunity cost than another producer
- Which country has the comparative advantage in computers?
- To answer this, must determine the opp. cost of a computer in each country.



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# Comparative Advantage

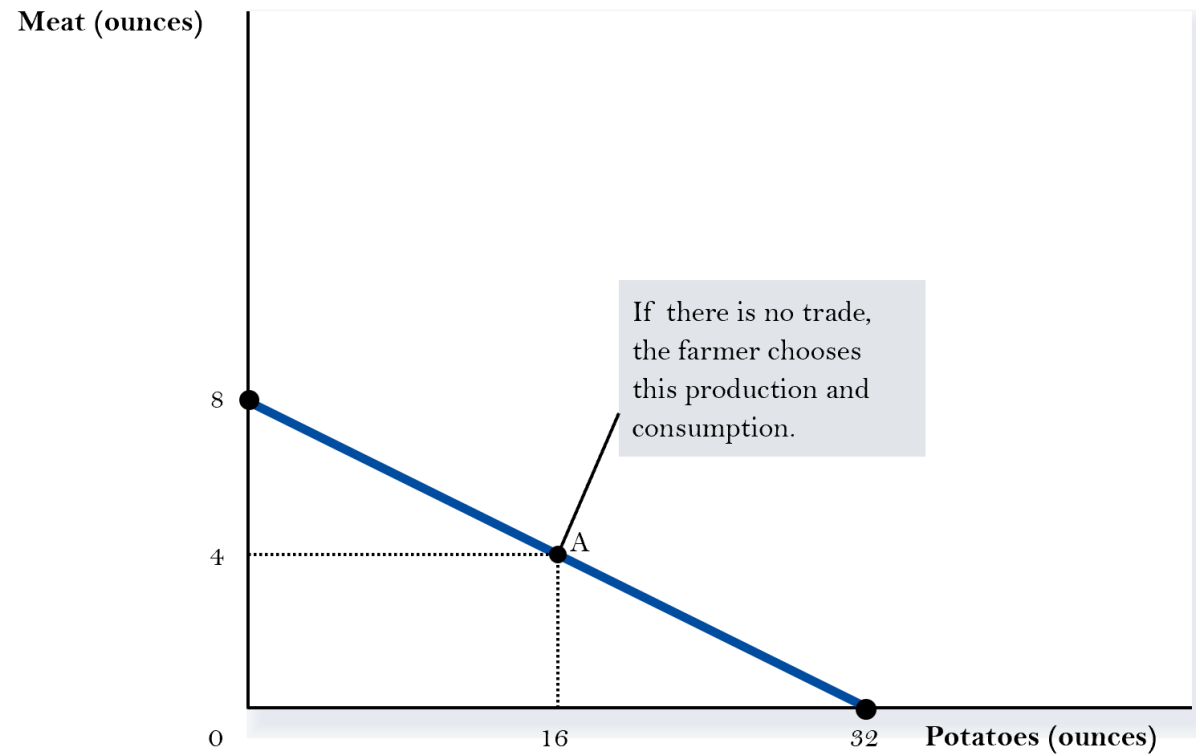
- The opportunity cost of a computer is
  - 10 tons of wheat in the U.S.:
    - Producing one computer requires 100 labor hours, which instead could produce 10 tons of wheat
  - 5 tons of wheat in Japan:
    - Producing one computer requires 125 labor hours, which instead could produce 5 tons of wheat
- Japan has comparative advantage in computers (Absolute advantage is not necessary for comparative advantage!)

# Comparative Advantage and Trade

- Gains from trade
  - Arise from comparative advantage (differences in opportunity costs)
- When each country specializes in the good(s) in which it has a comparative advantage, total production in all countries is higher, the world's “economic pie” is bigger, and all countries can gain from trade.
- The same applies to individual producers (like the farmer and the rancher example coming next) specializing in different goods and trading with each other.

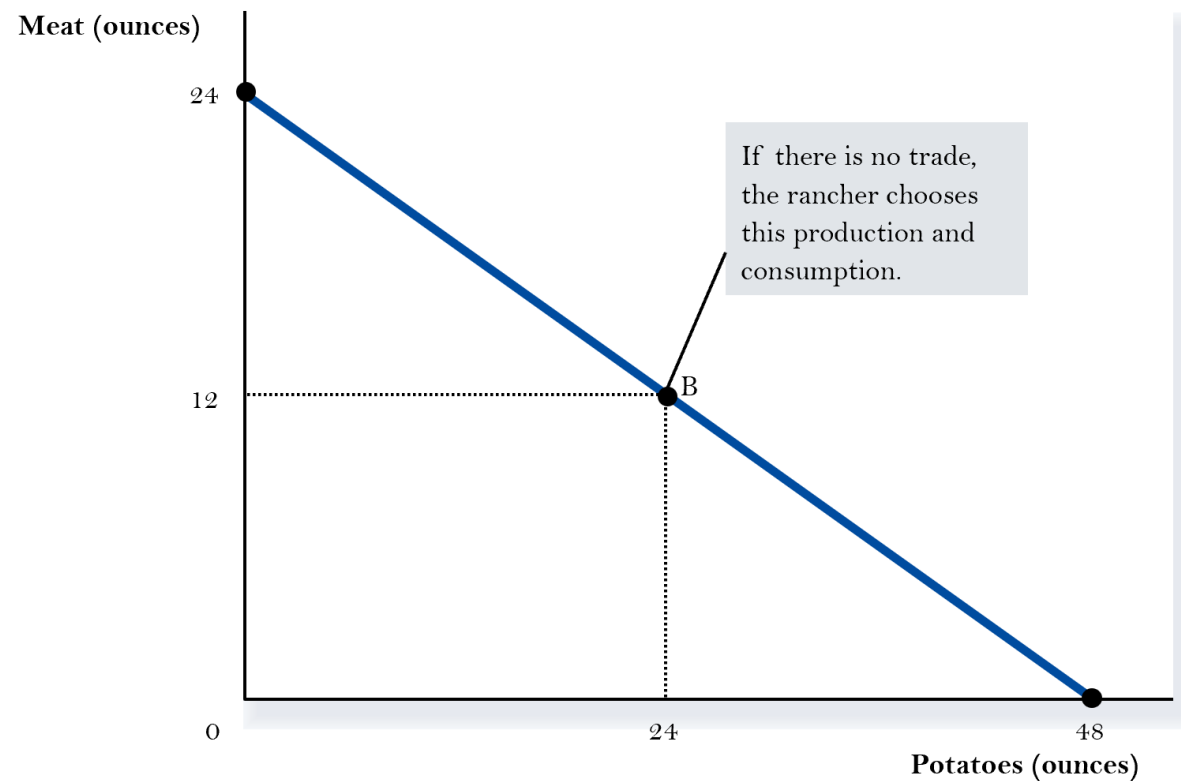
# Comparative Advantage and Trades: Example 2

## ■ (a) The Farmer's s Production Possibilities Frontier



# Comparative Advantage and Trades: Example 2

## ■ (b) The Rancher's Production Possibilities Frontier

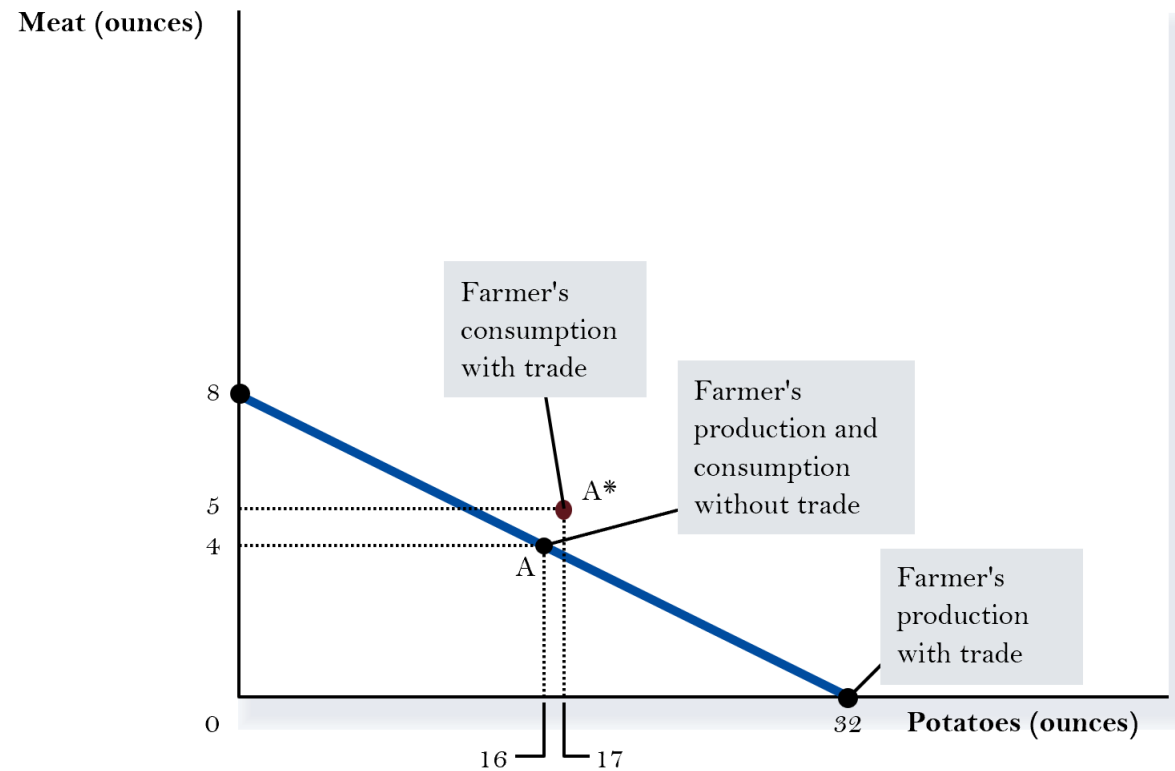


# Specialization and Trade

- Can they be better off if they specialize in what they are relatively good at?

# Specialization and Trade

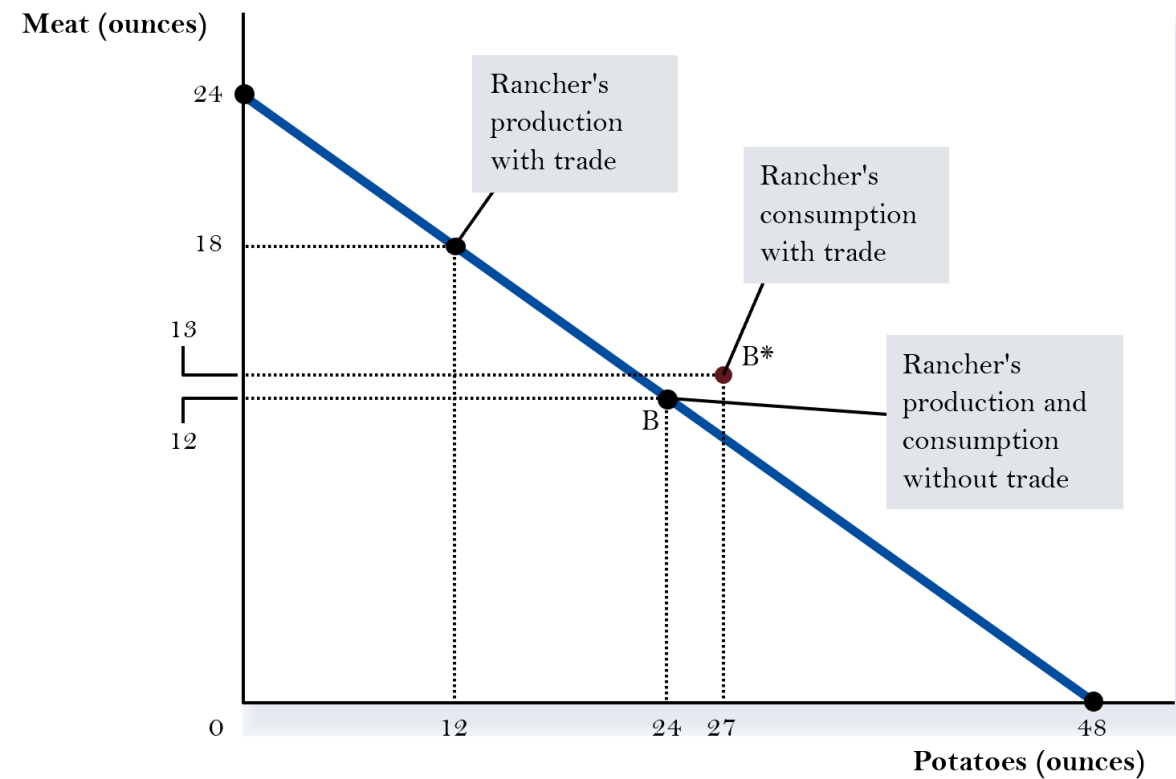
## ■ (a) The Farmer's Production and Consumption





# Specialization and Trade

## ■ (b) The Rancher's Production and Consumption



# The Gains from Trade: A Summary

	Farmer		Rancher	
	Meat	Potatoes	Meat	Potatoes
<b>Without Trade:</b>				
Production and Consumption	4 oz	16 oz	12 oz	24 oz
<b>With Trade:</b>				
Production	0 oz	32 oz	18 oz	12 oz
Trade	Gets 5 oz	Gives 15 oz	Gives 5 oz	Gets 15 oz
Consumption	5 oz	17 oz	13 oz	27 oz
<b>Gains from Trade:</b>				
Increase in Consumption	+1 oz	+1 oz	+1 oz	+3 oz

# Active Learning Absolute and comparative advantage

Argentina, 10,000 hours of labor/month:

- producing 1 lb. coffee requires 2 hours;
- producing 1 bottle wine requires 4 hours

Brazil, 10,000 hours of labor/month:

- producing 1 lb. coffee requires 1 hour
- producing 1 bottle wine requires 5 hours

1. Which country has an absolute advantage in the production of coffee?
2. Which country has a comparative advantage in the production of wine?

## 1. Brazil: absolute advantage in coffee

- Producing 1 lb. coffee:
  - One labor-hour in Brazil, but two in Argentina.

## 2. Argentina: comparative advantage in wine

- Argentina's opportunity cost of wine is 2 lb. coffee
  - The four labor-hours required to produce a bottle of wine could instead produce 2 lb. coffee
- Brazil's opportunity cost of wine is 5 lb. coffee

# Unanswered Questions....

- We made a lot of assumptions about the quantities of each good that each country produces, trades, and consumes, and the price at which the countries trade wheat for computers.
- In the real world, these quantities and prices would be determined by the preferences of consumers and the technology and resources in both countries.
- We will begin to study this in the next chapter.

# Can You Answer the Following Questions?

- Why do people – and nations – choose to be economically interdependent?
- How can trade make everyone better off?
- What is absolute advantage?
- What is comparative advantage?
- How are these concepts similar?
- How are they different?

End