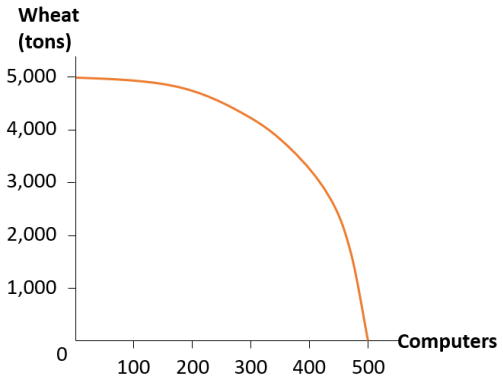
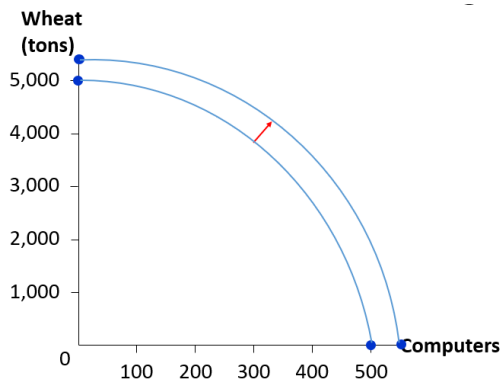
# Chapter 7: PPF and the Gains from Trade

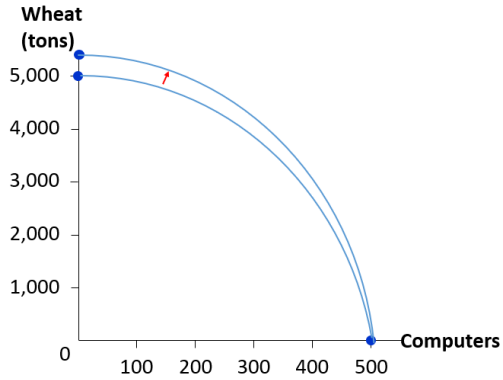
**Instructions:** These are the notes for Chapter 7. Make sure you review the material presented here and read the corresponding chapters on the textbook: **Chapters 2 and 3 on Mankiw.**




- **Production Possibilities Frontier (PPF)** shows the combinations of goods that an economy can produce given its resources.
- Similar to the budget line from Chapter 1.
- Points above are not attainable!
- Points below are attainable but inefficient.
- Why bow shaped: opportunity cost and diminishing returns!




- What if the economy grows? i.e. new labor, capital, natural resources, or new technologies fall from the sky or develop due to investment.




- What if a new tractor is invented that allows for faster production of wheat How will this effect the production of wheat? The production of computers?
- Productive farming allows rotating resources from production of wheat to computers.
- Note that if the country decides to produce only computers, there is no benefit from new tractors.

**Question**

- The country of Laputa produces two goods, cars and wine. Last year, it produced 1,000 cars and 15,000 cases of wine. This year, it produced 1,300 cars and 20,000 cases of wine. Given no other information, which of the following events could not explain this change?

  a. Laputa experienced a reduction in unemployment.

  b. Laputa experienced an improvement in car-making technology.

  c. Laputa acquired more resources.

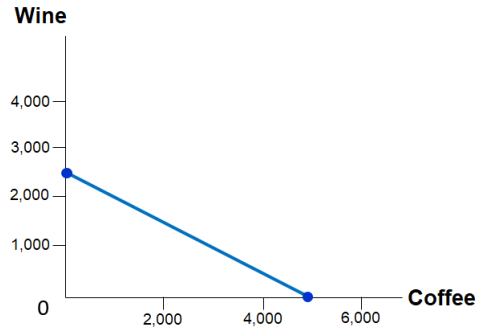
  d. Any of these events could explain the change.

**Why trade?**

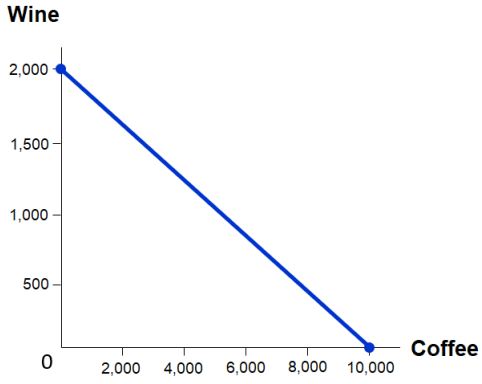
- Every day we rely on many people from around the world, most of whom we've never met, to provideus with the goods and services we enjoy.
- Why trade? Why not we produce it all as a nation?
- Trade can make everyone better off!


**A possible trade agreement?**

- Consider a possible trade agreement between Argentina and Brazil using the production possibilities model.
- Use the following information to draw Argentina's PPF assuming no opportunity cost effects for simplicity (line instead of a bow shape).
  - Argentina has 10,000 hours of labor available for production, per month
  - Producing one pound of coffee requires 2 hours of labor.
  - Producing one bottle of wine requires 4 hours of labor.



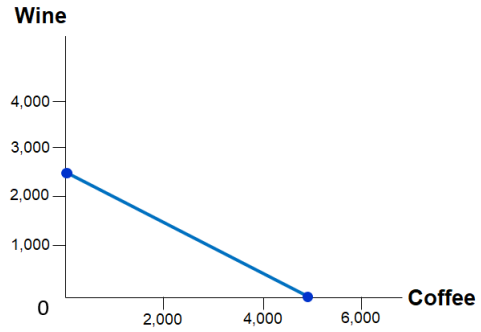

- Argentina has enough labor to produce 5,000 pounds of coffee, or 2,500 bottles of wine, or any combination along the PPF.



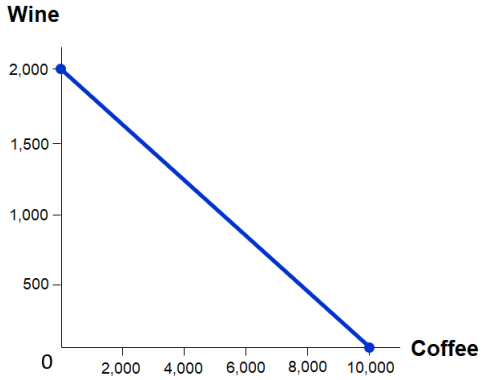

- Brazil has 10,000 hours of labor available each month.
  - Producing one pound of coffee requires 1 hours of labor.
  - Producing one bottle of wine requires 5 hours of labor.
- Brazil can produce 10,000 pounds of coffee, or 2,000 bottles of wine, or any combination along the PPF.

**Trade through Absolute Advantage?**

- **Absolute advantage.** producing a good more efficiently in a more productive way, i.e. requiring less labor hours per unit produced.
- Argentina has an absolute advantage in wine.
  - Producing one bottle of wine is 4 labor hours in Argentina. vs. 5 hours in Brazil.
- Brazil has an absolute advantage in coffee.
  - 1 labor hour for producing one pound of coffee in Brazil vs. 2 hours in Argentina.
- In a straightforward case where one country has an absolute advantage in one good and the other country on another good, each country should specialize and benefit from trade.
  - Argentina should only produce wine and Brazil should produce coffee.

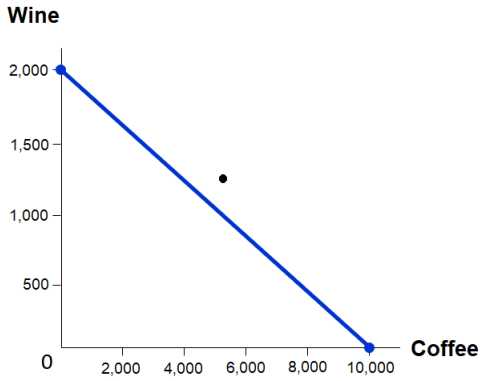



- Consider there is no trade.
- Suppose Argentina produces at the "mid-point", i.e. 5,000 labor hours on wine and 5,000 labor hours on coffee.
- Argentinians get to consume 1,250 bottles of wine and 2,500 pounds of coffee.




- Suppose Brazil produces at the mid-point too, i.e. 5,000 labor hours on wine and 5,000 labor hours on coffee.
- Brazilians get to consume 1,000 bottles of wine and 5,000 pounds of coffee.

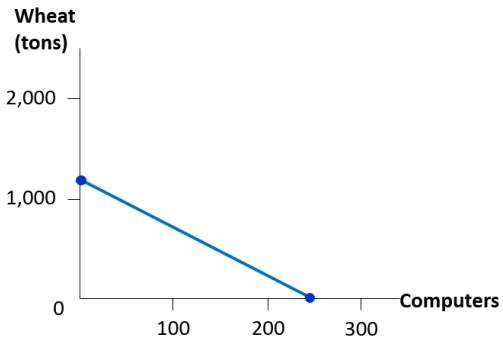
- Two countries in sum produced 2,250 bottles of wine and 7,500 pounds of coffee.
- What if they specialize in one good and trade?
- If Argentina only produces wine and Brazil only produces coffee, Argentina produces 2,500 bottles of wine and Brazil produces 10,000 pounds of coffee.
- There is more wine and coffee in the world! This means prices for both these goods go down when there is trade vs. isolation.
- Price of 1 bottle of wine is 4 pounds of coffee in the international market.
- Argentina can give 1,200 bottles of wine and get 4,800 pounds of coffee. As a result, Argentinians get to consume 1,300 wine and 4,800 coffee (vs. 1,250 wine and 2,500 coffee in isolation.)



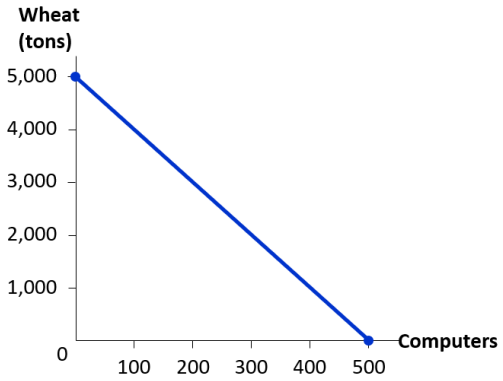

- Brazilians purchased 1,200 bottles of wine and gave 4,800 pounds of coffee. Hence they get to consume 1,200 wine and 5,200 coffee and (vs. 1,000 wine and 5,000 coffee in isolation).
- Also note that if Brazilians like wine a lot, they can trade their way to move the new dot even more higher towards more wine.

**Trade through Comparative Advantage?**

- What if one country has the absolute advantage in both goods? Should they still trade?
- Consider a possible trade agreement between Japan and the U.S. using the production possibilities model.
- Use the following information to draw Japan's PPF assuming no opportunity cost effects for simplicity.
  - 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.




- Japan has enough labor to produce 240 computers, or 1200 tons of wheat, or any combination along the PPF.

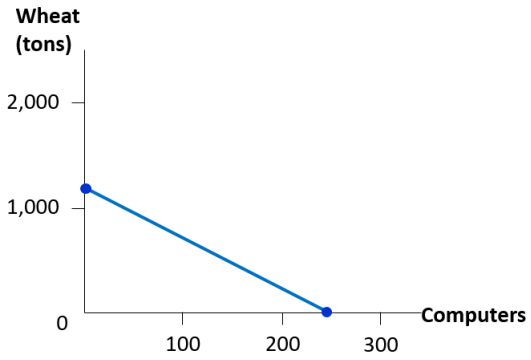



- The U.S. has 50,000 hours of labor available each month.
  - Producing one ton of wheat requires 10 hours.
  - Producing one computer requires 100 hours.
- The U.S. can produce 500 computers, or 5,000 tons of wheat, or any combination along the PPF.

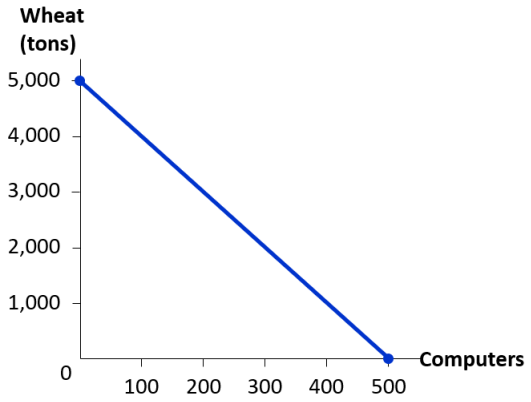
- The U.S. has an absolute advantage in wheat.
  - Producing one ton of wheat with 10 labor hours in the U.S. vs. 25 hours in Japan.
- The U.S. has an absolute advantage in computers too.
  - 100 hours for producing one computer in the U.S. vs. 125 hours in Japan.
- Should the U.S. and Japan not trade this case? Does the U.S. have incentive to import one of the goods?
- **Comparative advantage.** One country has comparative advantage on a good if the country has a smaller opportunity cost in producing that good, i.e. less to give up.

  - Comparative advantage theory says they should still trade!

- What is the cost of producing one computer in the United States? i.e. how many wheat we have to give up for one more computer?
  - One computer in the U.S. requires 100 labor hours.
  - 100 labor hours could have produced 10 tons of wheat.
  - Thus the opportunity cost of one computer is 10 wheat for the U.S.
- In Japan, producing one computer requires 125 hours of labor. This labor could have produced 5 tons of wheat. So the opportunity cost of one computer is 5 wheat for Japan.
- Opportunity cost of producing computer in Japan is smaller: Japan has comparative advantage in producing computers.
- Opportunity cost of producing wheat in the U.S. smaller: the U.S. has comparative advantage in producing wheat.
  - Note: It is impossible for one country to have comparative advantage in both goods because it's in "relative" or "comparative" terms.



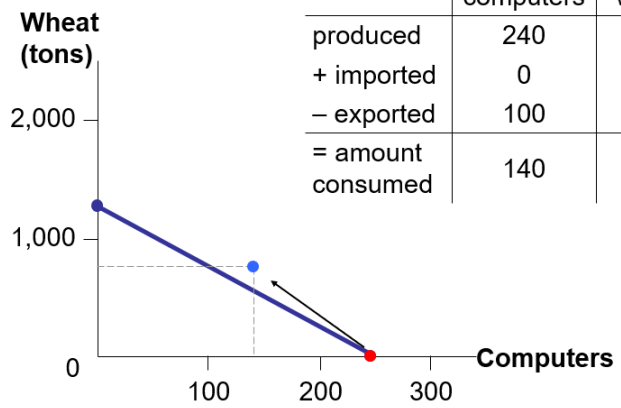

- Consider there is no trade.
- Suppose Japan produces at the "mid-point", i.e. 15,000 labor hours on wheat and 15,000 labor hours on computers.
- Japanese consumers get to consume 600 tons of wheat and 120 computers.



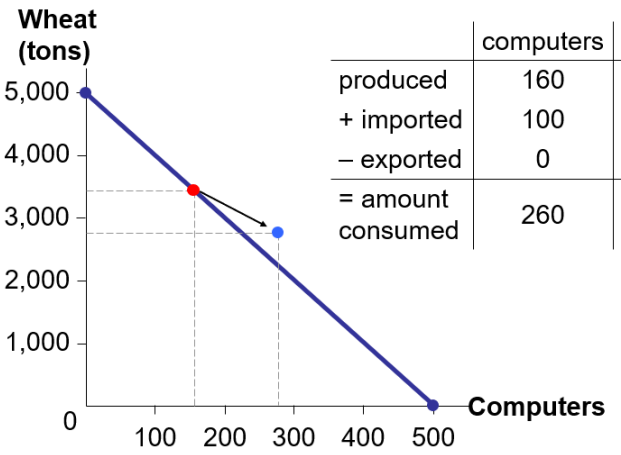

- Suppose the U.S. produces at the mid-point too, i.e. 25,000 labor hours on wheat and 25,000 labor hours on computers.
- Americans get to consume 2,500 tons of wheat and 250 computers.

- Two countries in sum produced 370 computers and 3,100 tons of wheat.
- What if they specialize in one good and trade?

- Suppose Japan only produces computers: 240 computers total.
- Suppose the U.S. produces 160 computers, taking 16,000 labor hours. With the remaining 34,000 labor hours, it can produce 3,400 wheat.
- There are more computers and wheat in the world now (400 computers and 3,400 wheat). Prices go down compared to the isolation case.
- One more necessity: "attractive" world market prices.
  - Recall that price of a computer is 10 wheat in the U.S. and 5 wheat in Japan.
  - The U.S. would be willing to import computers only if the world market price is less than 10 wheat.
  - Japan would be willing to export computers if the price of computer is above 5 wheat.
  - Trade only happens if the price of a computer is between 5 and 10 wheat (in this example it is approximately 8.5 wheat).
- Suppose now the U.S. exports 850 tons of wheat to Japan, and imports 100 computers from Japan.
- This also means Japan imports 850 tons of wheat and exports 100 computers.




| | computers | wheat |
|---|---|---|
| produced | 240 | 0 |
| + imported | 0 | 850 |
| – exported | 100 | 0 |
| = amount consumed | 140 | 850 |




| | computers | wheat |
|---|---|---|
| produced | 160 | 3400 |
| + imported | 100 | 0 |
| – exported | 0 | 850 |
| = amount consumed | 260 | 2550 |

- Trade makes both countries better off because specialization unlocks both countries' potential at doing what they are good at.
  - If Newton had done everything by himself, i.e. sewing his clothes, collecting water from the spring... could he have made his discoveries?
- World's "economic pie" gets bigger with trade.

**Question**

- When an economist points out that you and millions of other people are interdependent, he or she is referring to the fact that we all
  a. rely upon the government to provide us with the basic necessities of life.
  b. rely upon one another for the goods and services we consume.
  c. have similar tastes and abilities.
  d. are concerned about one another's well-being.