N. GREGORY MANKIW NINTH EDITION

PRINCIPLES OF ECONOMICS

CHAPTER 3

Interdependence and the Gains from Trade

Modified by Joseph Tao-yi Wang

Interactive PowerPoint Slides by:
V. Andreea Chiritescu
Eastern Illinois University

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

IN THIS CHAPTER

- 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?

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

ASK THE EXPERTS

Trade between China and the United States–1

"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."

What do economists say?

Source: IGM Economic Experts Panel, June 19, 2012.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Interdependence

- Interdependence
  - 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
- "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

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Our example

- Assumptions:
  - Two countries: the U.S. and Japan
  - Two goods: airplanes and soybeans
  - One resource: labor, measured in hours
- We want to determine 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

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

EXAMPLE 1: The U.S.

- The U.S. economy has 50,000 labor hours per month available for production
  - Produces only two goods: airplanes and soybeans
  - To produce 1 airplane requires 500 labor hours
  - To produce 1 ton of soybeans requires 10 labor hours

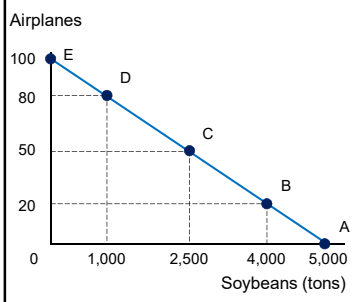
© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

EXAMPLE 1: Building the PPF

	Employment of labor hours		Production	
	Airplanes	Soybeans	Airplanes	Soybeans
A	50,000	0	100	0
B	40,000	10,000	80	1,000
C	25,000	25,000	50	2,500
D	10,000	40,000	20	4,000
E	0	50,000	0	5,000

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

EXAMPLE 1: The U.S. PPF

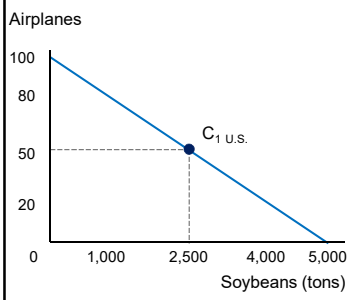


The U.S. has enough labor to produce :

- 100 airplanes,
- OR 5,000 tons of soybeans,
- OR any combination along the PPF.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

EXAMPLE 1: The U.S. Without Trade



Suppose the U.S. uses half its labor to produce each of the two goods.

- The U.S. production and consumption would be: 50 airplanes and 2,500 tons of soybeans

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 1: Derive Japan's PPF

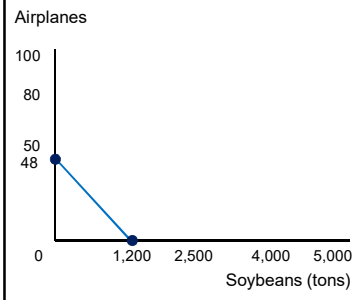
Use the following information to draw Japan's PPF:

- Japan has 30,000 labor hours per month available for production
- Produces only two goods: airplanes and soybeans
- To produce 1 airplane requires 625 labor hours
- To produce 1 ton of soybeans requires 25 labor hours

- Your graph should measure soybeans (tons) on the horizontal axis.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 1: Answers

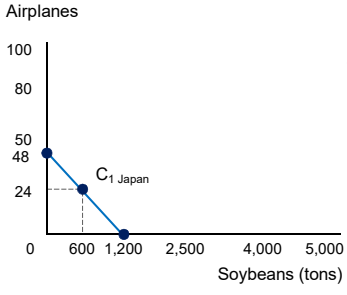


Japan has enough labor to produce :

- 48 airplanes,
- OR 1,200 tons of soybeans,
- OR any combination along the PPF.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 1: Japan Without Trade



Suppose Japan uses half its labor to produce each of the two goods.

- Japan's production and consumption would be: 24 airplanes and 600 tons of soybeans

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Consumption With and Without Trade

- Without trade:
  - U.S. consumers get 50 airplanes and 2,500 tons of soybeans
  - Japanese consumers get 24 airplanes and 600 tons soybeans
- 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

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 2: Production Under Trade

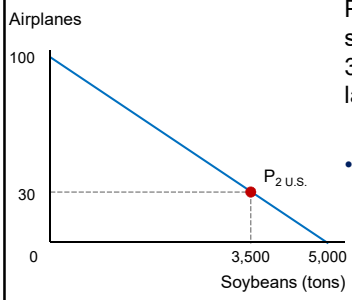
We continue Example 1 and Active Learning 1, but this time the two countries will choose different production points.

A. U.S. produces 3,500 tons of soybeans.
- How many airplanes can the U.S. produce with the remaining resources?
- Draw this point on the PPF.

A. Japan produces 48 airplanes.
- How many tons of soybeans can Japan produce with the remaining resources?
- Draw this point on the PPF.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 2**A**: U.S. Production With Trade

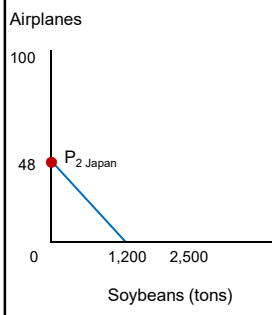


Producing 3,500 tons of soybeans requires 3,500 * 10 = 35,000 labor hours.

- The remaining (50,000 – 35,000) = 15,000 labor hours are used to produce 15,000 / 500 = 30 airplanes.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 2**B**: Japan's Production With Trade



Producing 48 airplanes requires all of Japan's resources: 48 * 625 = 30,000 labor hours.

- So, Japan would produce 0 tons of soybeans.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Exports and Imports

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

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 3: Consumption Under Trade

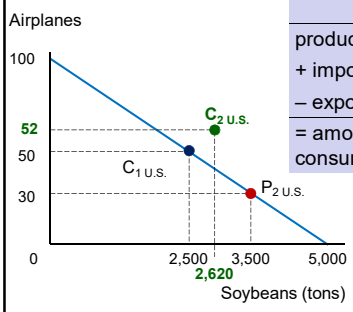
We continue Active Learning 2, but this time the two countries will be able to trade: 22 airplanes for 880 tons of soybeans.

A. The U.S. exports 880 tons of soybeans and imports 22 airplanes.
- How much of each good is consumed in the US? Plot this combination on the U.S. PPF.

A. Japan exports 22 airplanes and imports 880 tons of soybeans.
- How much of each good is consumed in Japan? Plot this combination on Japan's PPF.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

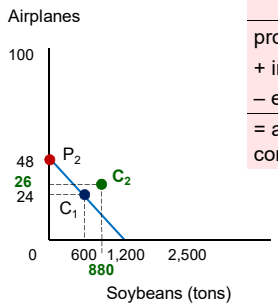
Active Learning 3**A**: U.S. Consumption With Trade



	airplanes	soy
produced	30	3,500
+ imported	22	0
– exported	0	880
= amount consumed	52	2,620

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 3**B**: Japan's Consumption With Trade



	airplanes	soy
produced	48	0
+ imported	0	880
– exported	22	0
= amount consumed	26	880

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Trade Makes Both Countries Better Off

U.S.			
	consumption without trade	consumption with trade	gains from trade
airplanes	50	52	**2**
soybeans	2,500	2,620	**120**
Japan			
	consumption without trade	consumption with trade	gains from trade
airplanes	24	26	**2**
soybeans	600	880	**280**

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Where Do These Gains Come From?

- Absolute Advantage:
  - The ability to produce a good using fewer inputs than another producer
- In our example:
  - Absolute advantage in soybeans: the U.S.
    - Producing 1 ton of soybeans uses 10 labor hours in the U.S. vs. 25 in Japan
  - Absolute advantage in airplanes: the U.S.
    - Producing one airplane requires 625 labor hours in Japan, but only 500 in the U.S.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Where Do These Gains Come From?

The U.S. has an absolute advantage in both goods!

- So why does Japan specialize in airplanes?
- Why do both countries gain from trade?

- Two countries can gain from trade
  - When each specializes in the good it produces at lowest cost

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

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
  - The opportunity cost of an airplane = amount of soybeans that could be produced using the labor needed to produce one airplane

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Comparative Advantage

- Comparative advantage
  - The ability to produce a good at a lower opportunity cost than another producer
- Principle of comparative advantage
  - Each good should be produced by the individual that has the smaller opportunity cost of producing that good

Specialize according to comparative advantage

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

EXAMPLE 2: Comparative Advantage

- The U.S.: produce 1 airplane using 500 labor hours; produce 1 ton of soybeans using 10 labor hours
- Japan: produce 1 airplane using 625 labor hours; produce 1 ton of soybeans using 25 labor hours

A. For each country, calculate the opportunity cost of producing each good.

B. Which country has comparative advantage in the production of soybeans?

C. Which country has comparative advantage in the production of airplanes?

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

EXAMPLE 2**A**: Calculating Opportunity Costs

- The U.S. :
  - Produce 1 airplane using 500 labor hours, but using the 500 labor hours to produce soybeans would have produced 500/10 = 50 tons of soybeans (TS)
  - Opportunity cost of 1 airplane = 50 TS
  - Opportunity cost of 1 TS = 0.02 airplanes
- Japan:
  - Opportunity cost of 1 airplane = 25 TS
  - Opportunity cost of 1 TS = 0.04 airplanes

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

EXAMPLE 2**B, C**: Comparative Advantage

	Opportunity cost of producing:	
	1 Airplane	**1 Ton of soybeans**
The U.S.	50 tons of soybeans	0.02 airplanes
Japan	25 tons of soybeans	0.04 airplanes

- Comparative advantage in airplanes: Japan
  - Because Japan only has to give up 25 tons of soybeans (less than the 50 for U.S.)
- Comparative advantage in soybeans: the U.S.
  - Because the U.S. has the lowest opportunity cost of producing soybeans

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

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
  - All countries can gain from trade

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

The Price of the Trade

- The Price of Trade
  - Must lie between their opportunity costs
- In our example: 22 airplanes were traded for 880 tons of soybeans
  - So, the price of trade is 1 airplane for 40 tons of soybeans
    - Greater than Japan's opportunity cost of 1 airplane (25 tons of soybeans)
    - Lower than U.S. opportunity cost of 1 airplane (50 tons of soybeans)

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 4: Argentina and Brazil

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

A. Which country has an absolute advantage in the production of coffee?

B. Which country has a comparative advantage in the production of wine?

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Active Learning 4: Answers

A. Absolute advantage in the production of coffee?
- Fewer resources to produce 1 lb. of coffee
- Brazil: (1 labor-hour in Brazil, but 2 in Argentina)

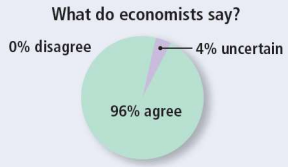
B. Which country has a comparative advantage in the production of wine?
- Producing wine at the lowest opportunity cost
- Argentina's opportunity cost of wine= 2 lb. coffee
- Brazil's opportunity cost of wine= 5 lb. coffee

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

ASK THE EXPERTS

Trade between China and the United States

"Some Americans who work in the production of competing goods, such as clothing and furniture, are made worse off by trade with China."



Source: IGM Economic Experts Panel, June 19, 2012.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

THINK-PAIR-SHARE

You are watching an election debate on television. A candidate says, "We need to stop the flow of foreign steel into our country. If we place a tariff on imports of steel, our domestic steel production will rise and the United States will be better off."

A. Will the U.S. be better off if we limit steel imports? Explain.

B. Will anyone in the U.S. be better off if we limit steel imports? Explain.

C. In the real world, does every person in the country gain when restrictions on imports are reduced? Explain.

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

CHAPTER IN A NUTSHELL

- Interdependence and trade are desirable
  - Allow everyone to enjoy a greater quantity and variety of goods and services
- Comparative advantage: being able to produce a good at a lower opportunity cost
- Absolute advantage: being able to produce a good with fewer inputs
- The gains from trade are based on comparative advantage, not absolute advantage

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

CHAPTER IN A NUTSHELL

- Trade makes everyone better off:
  - It allows people to specialize in those activities in which they have a comparative advantage
- The principle of comparative advantage applies to countries as well as to people
- Economists use the principle of comparative advantage to advocate free trade among countries

© 2021 Cengage Learning®. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website or school-approved learning management system for classroom use.

Chapter 3: Gains From Trade

- Trade can make people better off
- Key Idea: Comparative Advantage

- Suggested Homework:
  - Read Mankiw Chap. 3
  - Mankiw, Chap.3, Problem 3, 8, 9