Comparative Advantage: Trading Pizzas and Brownies

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Standards and Benchmarks (see page 12)

Lesson Description

Students play the role of producers in two fictional countries, Alpha and Beta. Students use production cards to construct production possibilities tables. These tables are used to discuss productivity, opportunity costs, comparative advantage, and the benefits of trade. Producers in each country discover that if they specialize and trade, they can produce and consume more goods than they would have been able to produce and consume on their own. To obtain answer keys for the handouts and assessment in this lesson, contact Amy Hennessy at amy.hennessy@atl.frb.org.

Concepts

Absolute Advantage	Comparative Advantage
Opportunity cost	Productivity
Specialization	Trade

Objectives

Students will be able to

- distinguish between absolute and comparative advantage;
- determine which country has a comparative advantage in production;
- explain how specialization increases production possibilities; and
- explain how trade increases consumption possibilities.

Compelling Question

How do people benefit from specialization and trade?

Time Required

60 minutes

Materials

- *"Comparative Advantage: Trading Pizzas and Brownies" PowerPoint side deck, Slides 1-15*
- *Handouts 1 and 3, one copy for each student in half of the class*
- *Handouts 2 and 4, one copy for each student in the other half of the class*
- *Handout 5, one copy for each student*
- *Handout 5 Answer Key, one copy for the teacher*
- *Staplers, tape, or glue for each student*
- *Scissors for each student.*

Procedure

1. Display Slide 2 and discuss the following questions:
   - Why do people trade with one another? *(Answers will vary but lead students to understand that people trade when they think they will be better off after the trade.)*
   - Why do people and businesses buy goods from other countries? *(Once again, people trade when they believe that they will benefit. If a buyer in one country wants a good or service produced in another county, and the producer in the other county wants to sell the good or service, the trade is mutually beneficial.)*

2. Display Slide 3. Tell students that productivity is a measure of how much of a good or service (output) that can be produced with a specific quantity of resources (inputs). For example, the amount of a good or service an individual worker can produce in a specific amount of time is a measure of productivity. Discuss the following questions:
   - How productive do you think US workers are? *(Most will answer that US workers are among the most productive in the world.)*
   - If US workers are so productive, why do we trade with other countries? Shouldn't we produce everything for ourselves? *(Answers will vary, but students might say that other countries produce things that Americans want.)*

3. Tell the students that they are going to play the role of workers in two different fictional countries to investigate the relationship between productivity and trade and to understand the benefits of specialization and trade.

4. Divide the class into two groups.

5. Tell the students that they represent the people of two great countries, Alpha and Beta (assign a country to each half of the class). Display Slide 4 and share the story of Alpha and Beta.

   Teacher note: If students ask, the productive capacity of countries can differ for a variety of reasons. An abundance of natural resources, such as energy, favorable climate, or arable land can make a country more productive. Over time, investments in research and development lead to better technology and more efficient capital resources. An educated and healthy workforce can also make a country more productive.

6. Distribute a copy of *Handout 1: Alpha Production Cards* to each person of Alpha and a copy of *Handout 2: Beta Production Cards* to each person of Beta. Distribute scissors and tape, glue, or stapler to each student. Review the instructions on the handout and have students cut out and make their production cards as described in the instructions.

7. Distribute a copy of Handout 3: Alpha Worksheet to each person of Alpha and a copy of Handout 4: Beta Worksheet to each person of Beta. Have students follow the instructions and complete Part 1: Production (questions 1 – 4) on their handouts.

8. Display Slide 5 and discuss the following questions with the people of Alpha:
   - What is the total number of pizzas you could produce in six hours? *(12)*
   - If you produced this many pizzas, how many brownies could you produce? *(0)*
   - As you turned over your production cards to the brownie side one at a time, what combinations of pizza and brownies were you able to produce? Display Slide 5 and use the table to discuss and check answers.

9. Display Slide 6 and discuss the following questions with the people of Beta:
    - What is the total number of brownies you could produce in six hours? *(6)*
    - If you produced this many brownies, how many pizzas could you produce? *(0)*
    - As you turned over your production cards to the pizza side one at a time, what combinations of brownies and pizza were you able to produce? Display Slide 6 and use the table to discuss and check answers.
10. Discuss the following questions about the production tables with all students:
    - How does the number of brownies you can produce change as you produce more pizzas? *(It decreases.)*
    - How does the number of pizzas you can produce change as you produce more brownies? *(It decreases.)*
    - Why does this happen? *(Answers may vary. Guide students to recognize that it takes time to produce each good. Since production time is limited, spending more time producing one good means spending less time producing the other good.)*
11. Display Slide 7. Tell students that they have made a **production possibilities table** for a worker in their country. A **production possibility table** shows the output combinations that can be produced given an economy's available resources and technology. Their tables show the various combinations of pizzas and brownies it is possible for a worker to produce in six hours.
12. Tell students that without trade or some other change in the availability of resources, these production possibilities numbers are also the limit of what they can consume. While residents of both countries desire more pizza and more brownies, they are limited by their productive capacity. Have all students complete *Part 2: Production Possibilities* on their worksheet. They should refer to the production possibilities table to see if they have enough time to produce each combination in one day.
13. After the students have completed Part 2, discuss the following:
    - For both countries, could each worker produce combinations A and B? *(Yes, those combinations were on the table for the respective countries.)*
    - For both countries, could each worker produce combination C? *(No, there was not enough time in a six-hour day to produce that combination.)*
    - For both countries, could each worker produce combination D? *(Yes, but they could have produced more. That combination of pizzas and brownies did not take the full six hours.)*
14. Display Slide 8. Remind students that productivity is a measure of how much of a good or service that can be produced with a specific quantity of resources. One measure of **productivity** is the quantity of a good that a worker can produce in one hour, represented by one card. Discuss the following:
    - What can each worker from Alpha can produce in one hour? *(Either two pizzas or one brownie)*
    - What can each worker from Beta produce in one hour? *(Either half a pizza or one brownie)*
    - In which country are the workers more productive pizza producers? Who can produce more pizzas in an hour? *(Workers in Alpha can produce more pizzas than workers in Beta in the same amount of time.)*
    - In which country are the workers more productive brownie producers? Who can produce more brownies in an hour? *(Workers in Alpha and Beta are equally productive in brownie production. They can both make one brownie in an hour.)*

15. Display Slide 9 and explain that a country has an **absolute advantage** in production when its workers can produce more goods using the same resources (like work time) than people in another country—in other words, they are more productive. Discuss the following:
    - Which country has an absolute advantage in producing pizzas? *(Alpha)*
    - Which country has an absolute advantage in producing brownies? *(Neither one)*
    - If workers in Alpha are so much more productive at producing pizzas and equally as productive at producing brownies, can they benefit by trading with people from Beta? *(Answers will vary, but most students will say no.)*

16. Display Slide 10. Tell students that the opportunity cost is the value of the next best alternative when someone makes a choice or decision. Discuss the questions posed by the students in the image. Have students complete *Part 3: Opportunity Cost* of their worksheet. *(Alpha students should answer that they give up one brownie when they produce two pizzas, half a brownie when they make one pizza, and two pizzas when they make one brownie. Beta students should answer that they give up one brownie when they make half a pizza, they give up two brownies when they make a whole pizza, and they give up half a pizza when they make one brownie.)*

17. Display Slide 11. When workers from Alpha and Beta produce pizzas, the next-best alternative use of their time is producing brownies. This is their opportunity cost of producing pizza. When the workers from Alpha and Beta produce brownies the next-best alternative use of their time is producing pizzas. The opportunity cost of producing brownies is pizza production.
    - What is the opportunity cost of producing one pizza in Alpha? *(one-half of a brownie, because it only takes a half-hour to produce one pizza)*
    - What is the opportunity cost of producing one pizza in Beta? *(two brownies, because it takes two hours to produce a whole pizza)*
    - What is the opportunity cost of producing one brownie in Alpha? *(two pizzas, because it takes a full hour to produce one brownie)*
    - What is the opportunity cost of producing one brownie in Beta? *(one-half pizza, because that is all the pizza Beta can make in one hour)*

18. Display Slide 12. Explain that when the opportunity cost of producing a good is lower in one country than it is in another, the people in the first country—the country with the lower opportunity cost—are said to have a **comparative advantage** in producing that good. Discuss the following:
    - In which country is the opportunity cost of producing pizzas lower? (*Alpha. When a worker in Alpha produces one pizza, they give up one-half a brownie. When a worker in Beta produces pizza, they give up two brownies.)*
    - Which country has the comparative advantage in producing pizzas? *(Alpha)*
    - In which country is the opportunity cost of producing brownies lower? *(Beta. When a worker in Alpha produces a brownie, they give up two pizzas. When a worker in Beta produces a brownie, they give up half a pizza.)*
    - Which country has the comparative advantage in producing brownies? *(Beta)*

19. Continue to display Slide 12. Explain that when people have a comparative advantage in producing a good, they can end up with more total goods by producing that good and trading some of it for goods that other people have a comparative advantage in producing. Explain that concentrating on producing one (or a few) goods is called **specialization**. Discuss the following:
    - Which country should specialize in producing pizzas? Why? *(Alpha, because it has a lower opportunity cost.)*
    - Which country should specialize in producing brownies? Why? *(Beta, because it has a lower opportunity cost.)*
20. Tell the workers in Alpha to turn their production cards to the pizza side and tell the workers in Beta to turn their production cards to the brownie side to support this specialization. Tell students to complete *Part 4: Gains from Trade* on their worksheet.
21. Display Slide 13 and discuss the following:
    - If workers in Alpha specialize and produce pizzas and trade for brownies, would a trade of one pizza for one brownie be desirable? *(Yes, with trade the cost of a brownie would be one pizza, instead of one brownie for two pizzas if the workers of Alpha produced it themselves.)*
    - If workers in Beta specialize and produce brownies and trade for pizzas, would a trade of one brownie for one pizza be desirable? *(Yes, with trade the cost of one pizza would be one brownie, instead of one pizza for two brownies if the workers from Beta produced it themselves.)*
    - By trading some pizzas for brownies, the workers of Alpha are able to produce and consume the same number of pizzas and consume more brownies.
    - By trading some brownies for pizzas, the workers of Beta are able to produce and consume the same number of brownies and consume more pizzas.
    - People benefit from specialization and trade because they can consume more.

Closure

22. Display Slide 14. Review the content of the lesson by discussing the following:
    - How is productivity measured? *(Amount of output per unit of input per time or amount of output per worker per time)*
    - If workers in a country are more productive than workers in another country in producing a good, do they have an absolute or comparative advantage in producing it? *(Absolute advantage)*
    - If the opportunity cost of producing a good in one country is lower than that in another country, does the first country have an absolute or comparative advantage in producing it? *(Comparative advantage)*
    - How do people benefit from specialization and trade? *(As a result of specialization and trade people's consumption possibilities increase; they can consume more.)*

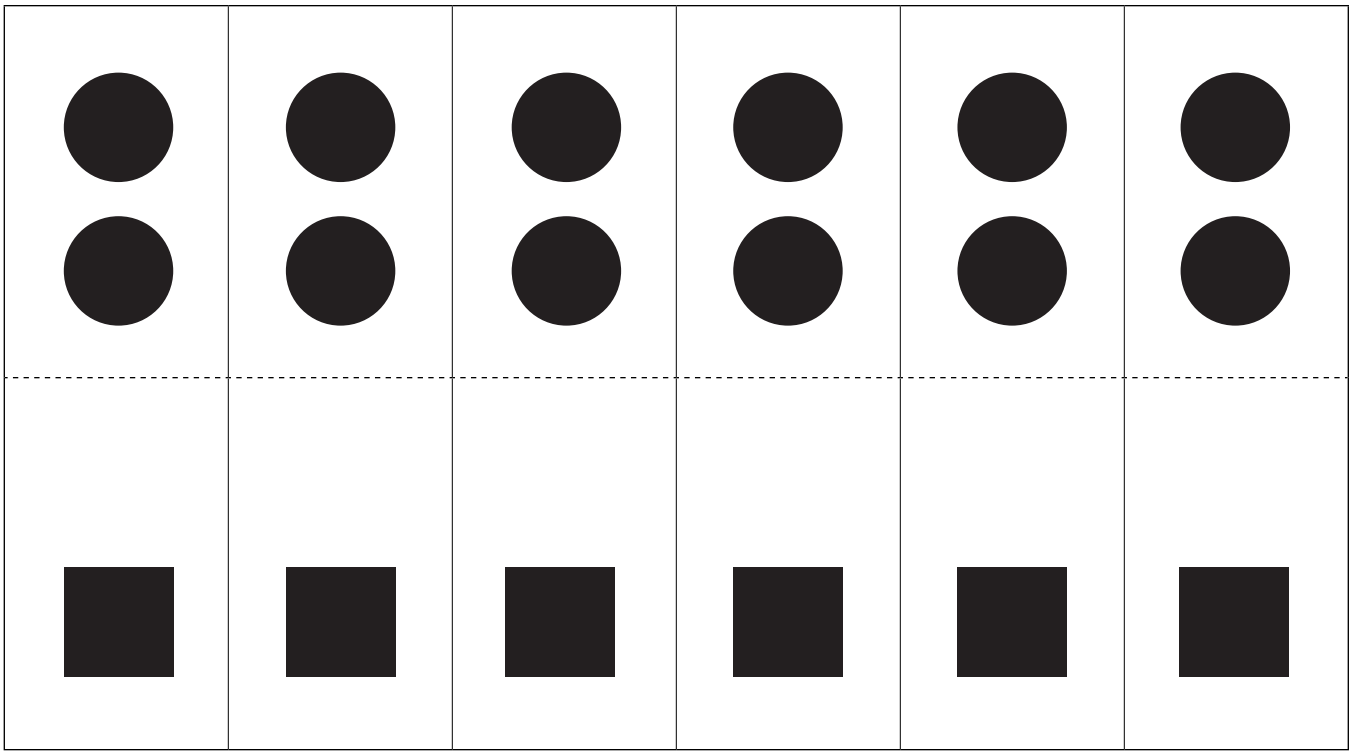
Assessment

23. Distribute a copy of *Handout 5: Assessment* to each student. Allow time for students to work, then review their answers using Comparative Advantage: Trading Pizzas and Brownies Assessment Answer Key.

Handout 1: Alpha Production Cards

You live in Alpha. Like most other workers in Alpha, you like to eat pizzas and brownies. The more pizzas and brownies you can get, the happier you are. Unfortunately, making these goods takes time, and you have only six hours a day to spend in doing so. In one hour, you can make two pizzas OR one brownie, but not both.

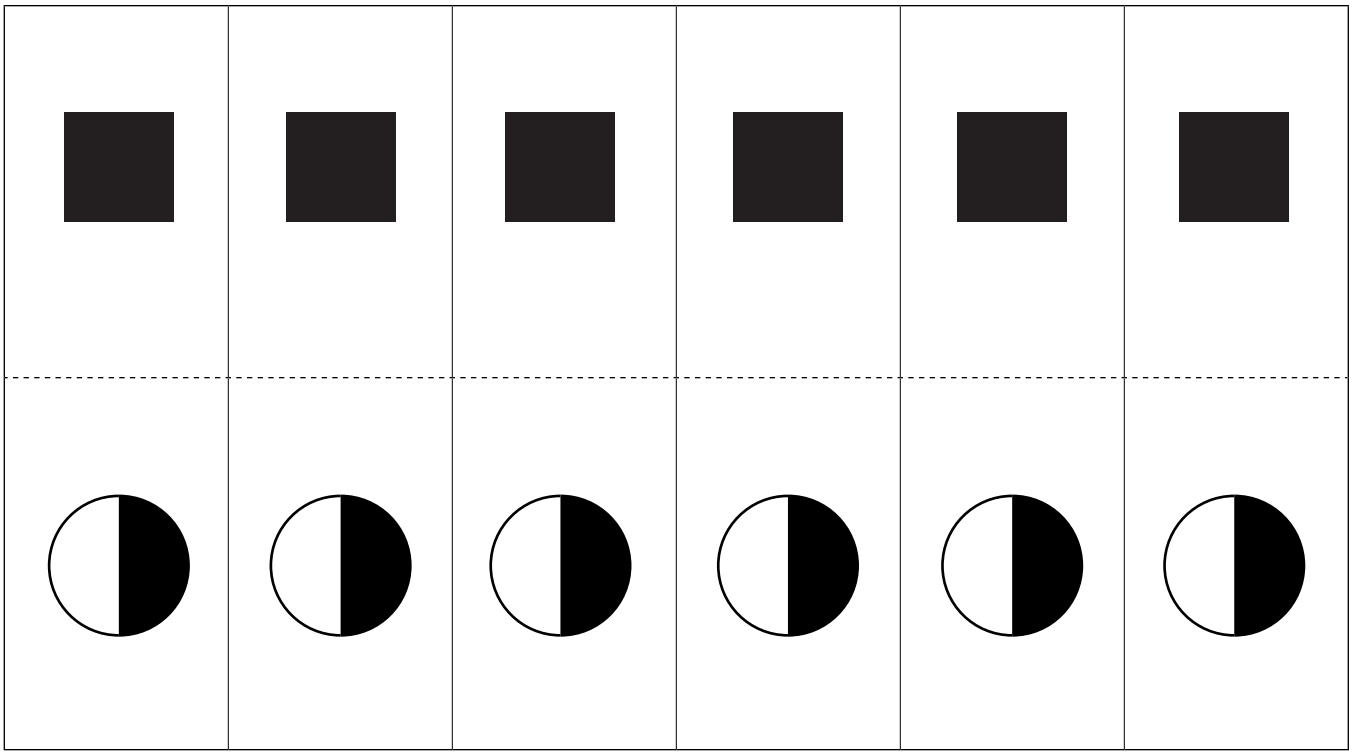
Cut out along the solid lines in the boxes below. This will give you six production cards. Each card shows what you could produce in one hour. The circles represent pizzas, and the squares represent brownies. Fold each card in half along the dotted line, with circles and squares facing out. Then staple, tape, or glue the two halves together. Lay these cards on your desk. Whichever side you have facing up on each card shows what you are producing during that hour. The six cards together show what combination of pizzas and brownies you can produce in six hours.



Handout 2: Beta Production Cards

You live in Beta. Like most other workers in Beta, you like to eat pizzas and brownies. The more pizzas and brownies you can get, the happier you are. Unfortunately, making these goods takes time, and you have only six hours a day to spend in doing so. In one hour, you can make half a pizza OR one brownie, but not both.

Cut out along the solid lines in the boxes below. This will give you six production cards. Each card shows what you could produce in one hour. The circles represent pizzas, and the squares represent brownies. Fold each card in half along the dotted line, with circles and squares facing out. Then staple, tape, or glue the two halves together. Lay these cards on your desk. Whichever side you have facing up shows what you are producing during that hour. The six cards together show what combination of pizzas and brownies you can produce in six hours.



Handout 3: Alpha Worksheet

Part 1: Production

Turn your production cards to show six hours spent making pizzas. What is the total number of pizzas you could produce in six hours?_____If you produced this many pizzas, how many brownies could you produce? _____ *Write these two numbers in the "6" column of the table below.*

Turn over ONE of your production cards. How many pizzas and brownies could you produce if you used your time in this way? _____brownies and _____pizzas. *Write these two numbers in the "5" column of the table below.*

Continue turning over the other production cards to the "brownie" side, one at a time. Each time, record the number of pizzas and brownies you could produce.

Hours spent producing pizzas	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Number of pizzas produced							
Number of brownies produced							

Part 2: Production Possibilities

Can you make the following combinations in one six-hour day? Circle your answer.

a. 8 pizzas and 2 brownies YES or NO

b. 4 pizzas and 4 brownies YES or NO

c. 6 pizzas and 5 brownies YES or NO

d. 2 pizzas and 2 brownies YES or NO

Part 3: Opportunity Cost

What is the opportunity cost of producing two pizzas—what do you give up when you produce two pizzas?

_____

What is the opportunity cost of producing one pizza—what do you give up when you produce one pizza?

_____

What is the opportunity cost of producing one brownie—what do you give up when you produce one brownie?

_____

Part 4: Gains from Trade

If you specialize in producing pizzas, how many brownies would you have? _____

If you traded one pizza and got one brownie, would you be better off? Why?

_____

If you traded four pizzas and got four brownies, would you be better off? Why?

_____

Handout 4: Beta Worksheet

Part 1: Production

Turn your production cards to show six hours spent making brownies. What is the total number of brownies you could produce in six hours?_____If you produced this many brownies, how many pizzas could you produce? _____*Write these two numbers in the "6" column of the table below.*

Turn over ONE of your production cards. How many brownies and pizzas could you produce if you used your time in this way? _____brownies and _____pizzas. *Write these two numbers in the "5" column of the table below.*

Continue turning over the other production cards to the "pizza" side, one at a time. Each time, record the number of brownies and pizzas you could produce.

Hours spent producing pizzas	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Number of brownies produced							
Number of pizzas produced							

Part 2: Production Possibilities

Can you make the following combinations in one six-hour day? Circle your answer.

a. 4 brownies and 1 pizza YES or NO

b. 2 brownies and 2 pizzas YES or NO

c. 5 brownies and 3 pizzas YES or NO

d. 3 brownies and 1 pizza YES or NO

Part 3: Opportunity Cost

What is the opportunity cost of producing half a pizza—what do you give up when you produce half a pizza?

_____

What is the opportunity cost of producing one pizza—what do you give up when you produce one pizza?

_____

What is the opportunity cost of producing one brownie—what do you give up when you produce one brownie?

_____

Part 4: Gains from Trade

If you specialize in producing brownies, how many brownies could you produce? _____

If you traded one brownie and got one pizza, would you be better off? Why?

_____

If you traded four brownies and got four pizzas, would you be better off? Why?

_____

Handout 5: Assessment (1 of 2)

The table below shows the number of pounds of beef or cheese a worker in each country can produce in **one hour**. This would be like one card in the activity with Alpha and Beta. Given this information, answer the questions that follow.

	Beef	Cheese
Country A	1	1
Country B	2	6

1. The workers in which country are the most productive cheese producers? _____
   The workers in which country are the most productive beef producers? _____

2. Which country has an absolute advantage in producing cheese? _____
   Which country has an absolute advantage in producing beef? _____

3. What is the opportunity cost of producing one pound of beef in Country A?_____
   What is the opportunity cost of producing one pound of beef in Country B?_____

4. What is the opportunity cost of producing one pound of cheese in Country A?_____
   What is the opportunity cost of producing one pound of cheese in Country B? _____

5. Which country has a comparative advantage in producing beef?_____
   Which country has a comparative advantage in producing cheese?_____

6. Which good should workers in Country A specialize in producing? _____
   Which good should workers in Country B specialize in producing? _____

7. If each worker in Country B works only four hours per day, complete his/her production possibilities in the table below.

Hours spent producing cheese	4	3	2	1	0
Pounds of cheese produced	24				0
Pounds of beef produced		2		6	

8. Assuming each worker in Country B specializes in producing cheese and can trade two pounds of cheese for one pound of beef, answer these questions:

   If the worker produces 24 pounds of cheese, keeps 18 pounds of cheese, and trades 6 away, the worker will receive 3 pounds of beef. Would they be better off? _____

Handout 5: Assessment (2 of 2)

9. If each worker in Country A works only four hours per day, complete his/her production possibilities in the table below.

Hours spent producing beef	4	3	2	1	0
Pounds of beef produced	4				0
Pounds of cheese produced			2		

10. Assuming each worker in Country A specializes in producing beef and can trade one pound of beef for two pounds of cheese, complete the table below.

11. If the worker produces 4 pounds of beef, keeps 3 pounds of beef, and trades 1 away, the worker will receive 2 pounds of cheese. Would they be better off? _____

    Explain why both countries would be willing to trade two pounds of cheese for one pound of beef.

Standards and Benchmarks

Content Standard 6: Specialization

When individuals, regions, and nations specialize in what they can produce at the lowest cost and then trade with others, both production and consumption increase.

- **Benchmarks: Grade 8**
    1. Labor productivity is output per worker.
    2. Like trade among individuals within one country, international trade promotes specialization and division of labor and increases the productivity of labor, output, and consumption.
- **Benchmarks: Grade 12**
    1. Individuals and nations have a comparative advantage in the production of goods or services if they can produce a product at a lower opportunity cost than other individuals or nations.