

Interdependence and the Gains from Trade

Chapter 3




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This week

- We will play a game for extra credit 
- Chapter 3 
- Today January 25th is the last day to add classes
+ -
- Chapter 3's HW is due on Sunday February 13th 

International Trade Game

Overview of the Game

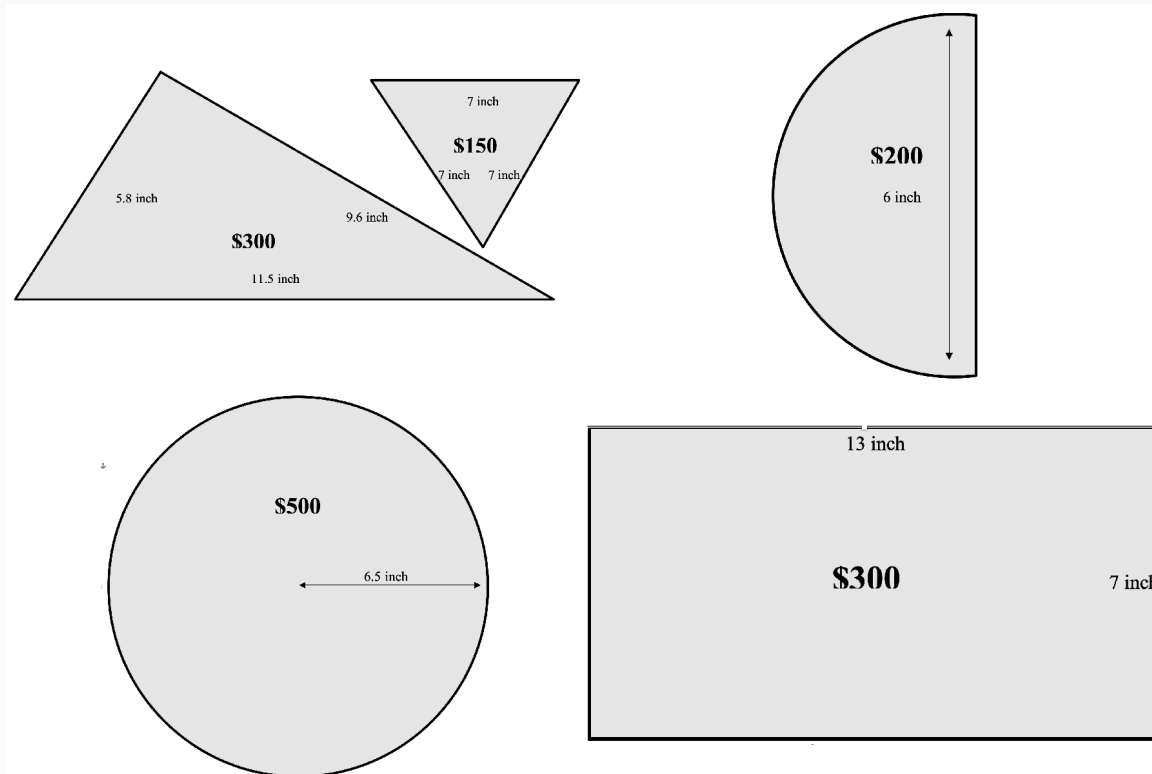
- Students should divide into 6 teams (8-14 students a team)
- Each team is a 'country'
- Each team will have an envelope with items
- Each team wants to have as much money as possible
- Trading items is allowed
- There's a trader at the front that you can sell your production to

Rules

- The objective is to make as much money by using the materials provided to you to make shapes
- Only the materials provided to you are allowed to be used to manufacture
- All shapes must be cut with clean sharp edges and must be the exact size specified by me
- Shapes can be sold to trader in batches
- Trader can reject inaccurate shapes
- More shapes more money
- You cannot use the envelope to make shapes
- You must stop whatever you're doing and listen when I talk

You have 30 minutes

Start your production



30:00

Discussion

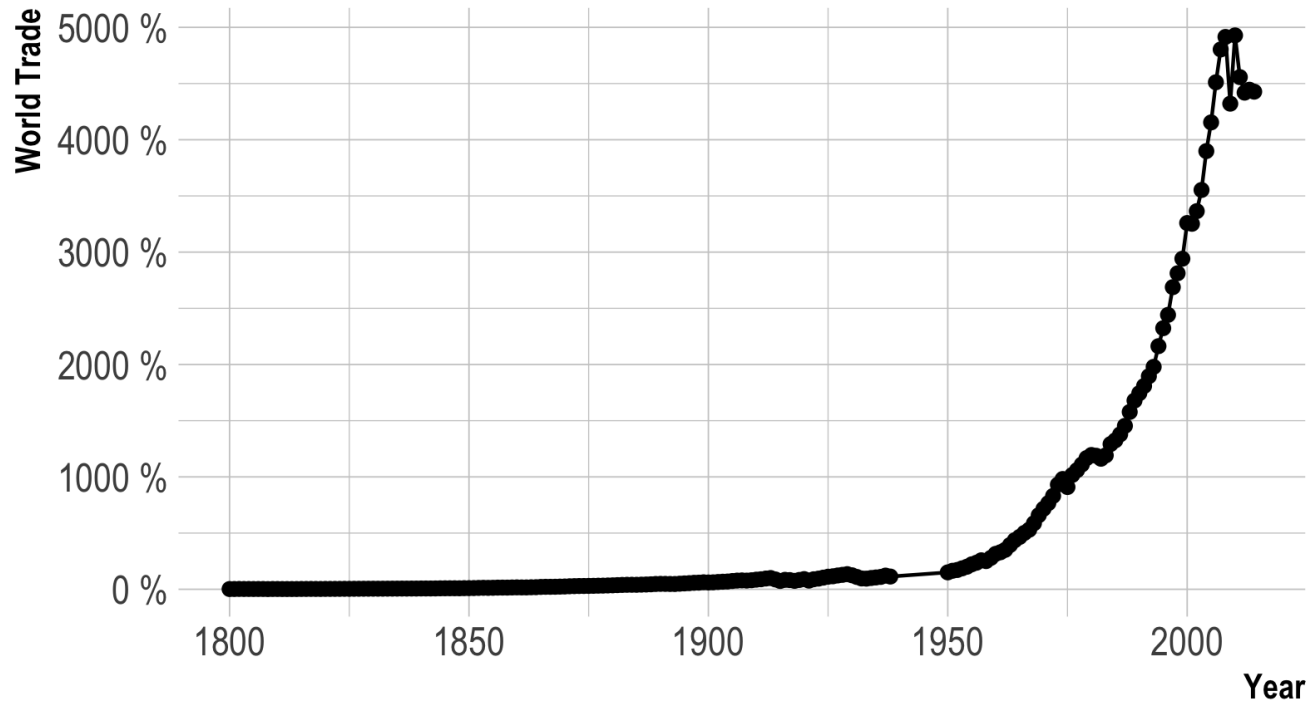
Questions

1. Did countries end the game richer or poorer than they started? Which ones?
2. What was it like to be a rich country? A poor country?
3. Was it easy or difficult to trade? Why?
4. Did any country feel especially powerful or powerless?
5. Which items were most popular? Which were least popular? Why?

Facts About Trade

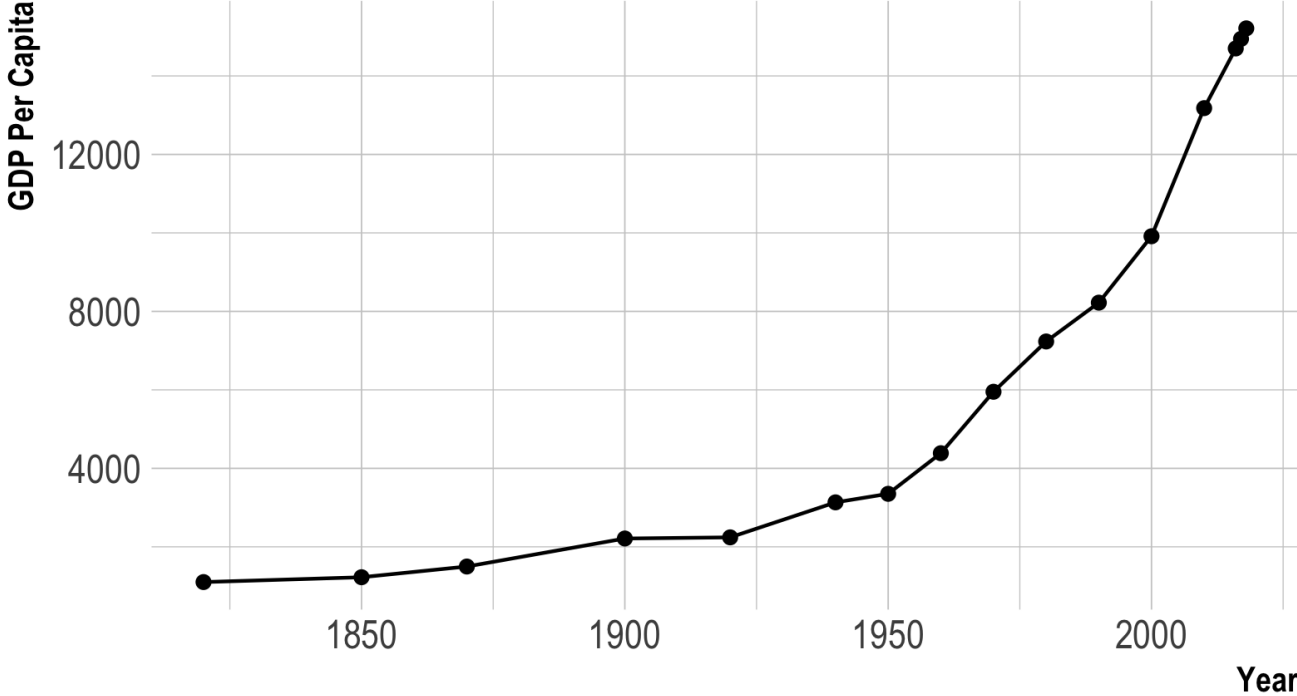
Trade over the last two century

Growth of Global Exports



GDP Per Capita

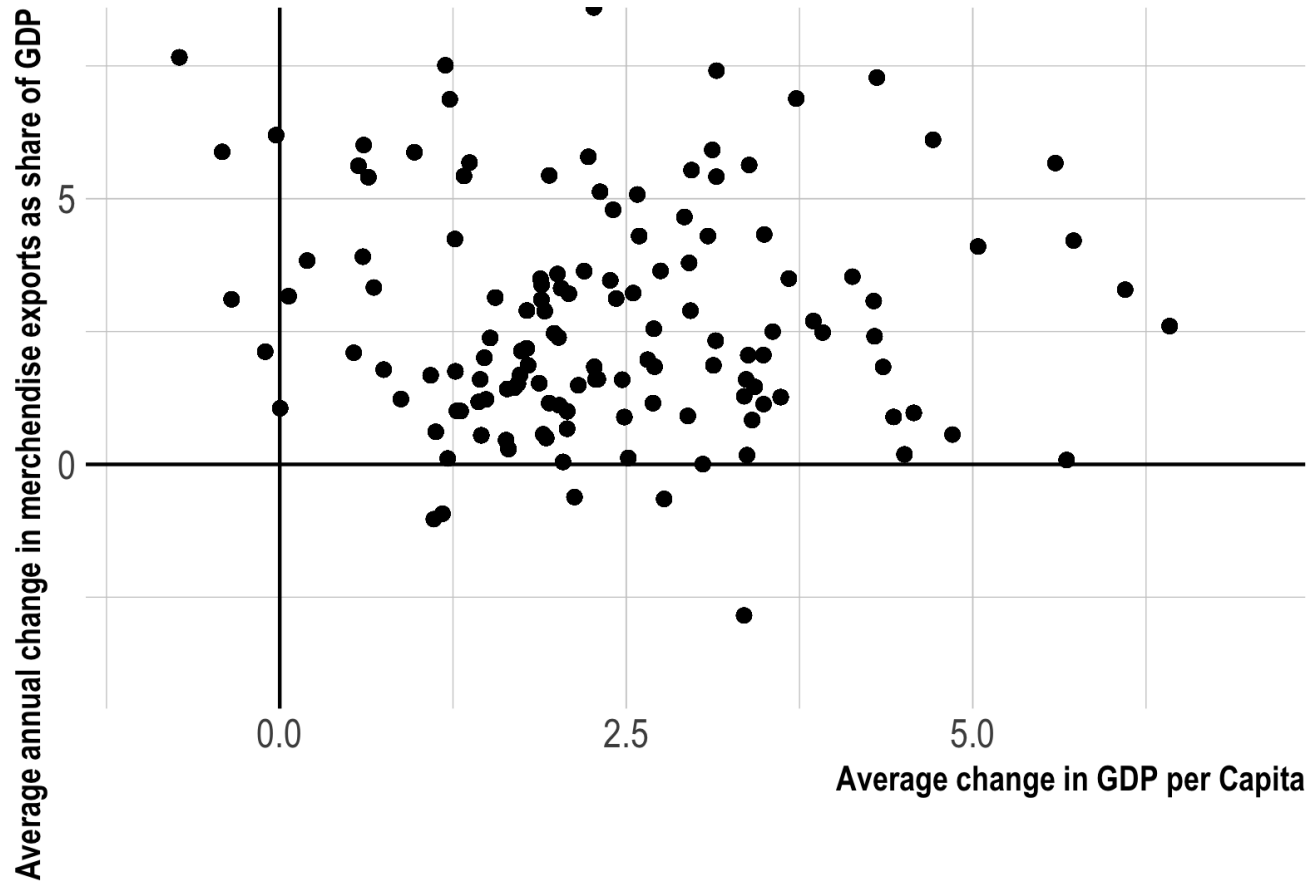
World GDP Per Capita Growth Over Time



Trade has grown more than proportionately with GDP



Trade and Growth

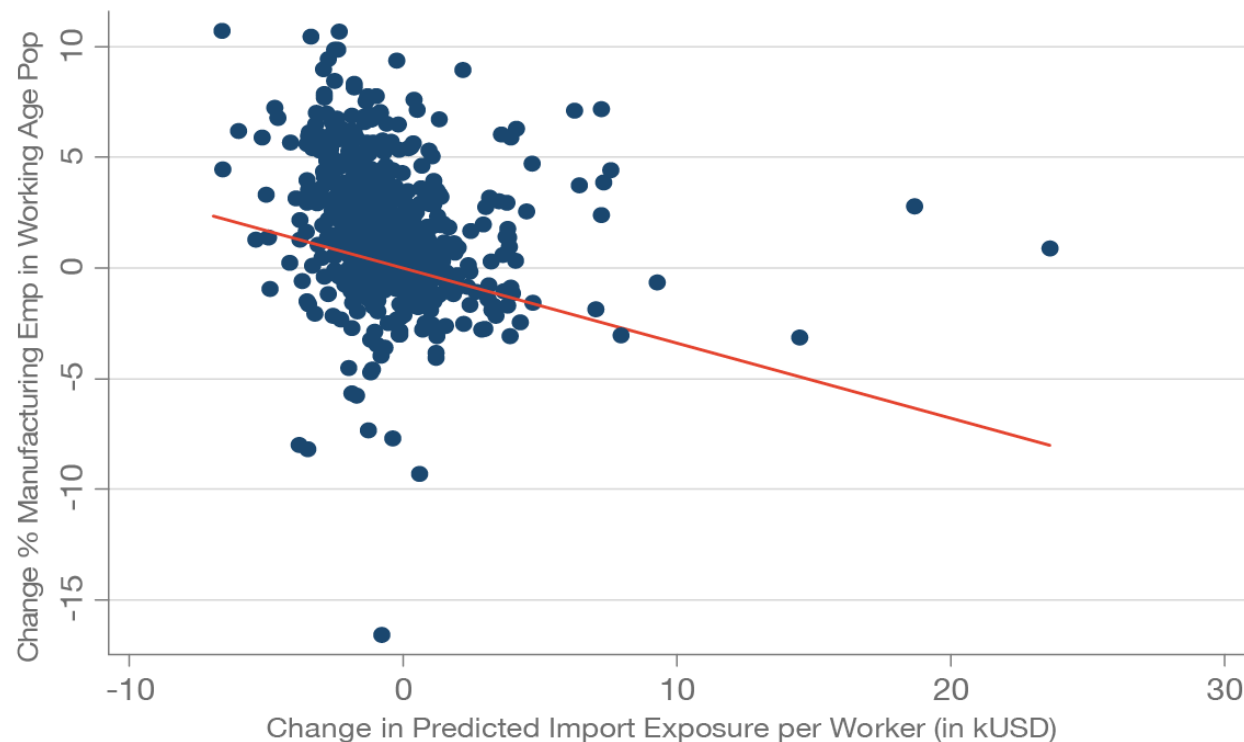


Trade did have some negative effects

Exposure to rising Chinese imports and changes in employment across local labor markets in the US (1999-2007)



Regions correspond to commuting zone in the US. The trend line shows a reduction in manufacturing employment in the commuting zones facing large increases in Chinese import exposure.



Note: OLS reduced form regression using the full Sample (N=722; coef = $-.33976267$, robust standard error = $.07116474$, $t = -4.77$)

Source: Figure 2B in Autor, Dom and Hanson (2013): "The China syndrome: Local labor market effects of import competition in the United States". American Economic Review, 103(6), 2121-68

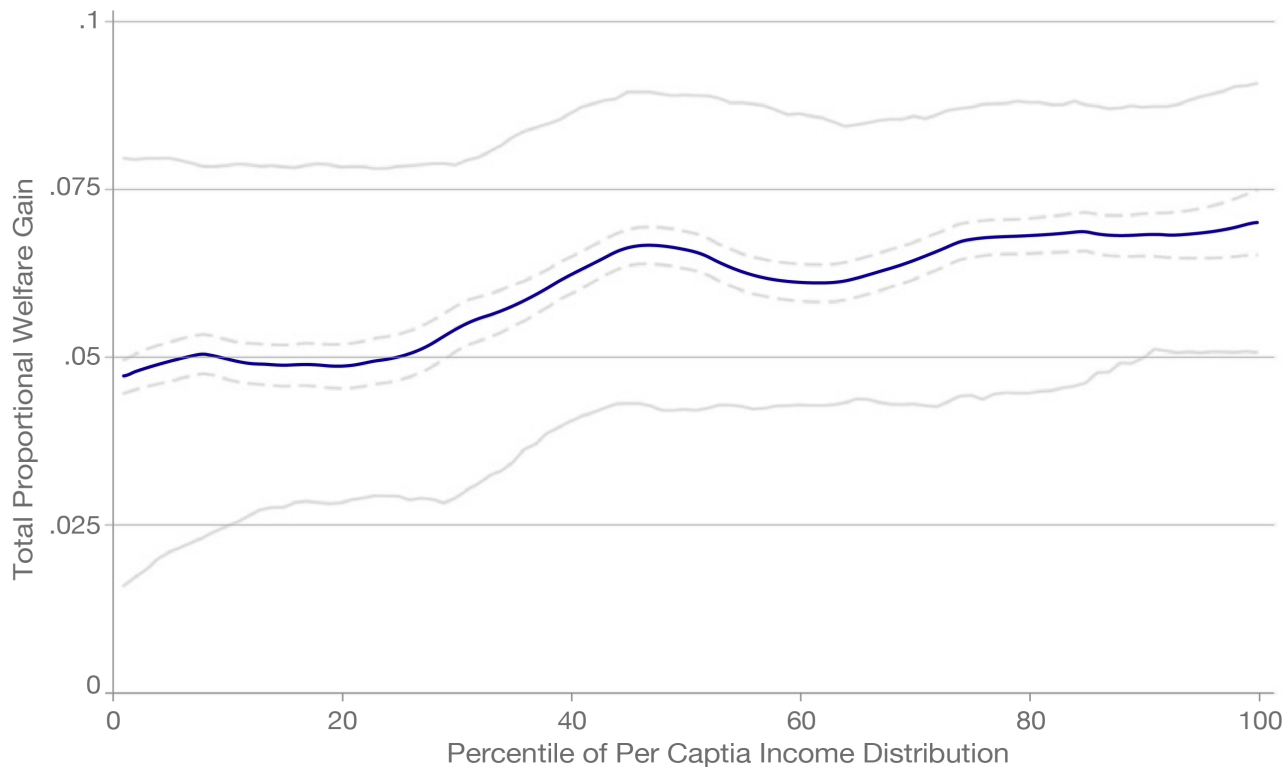
04/10/2018

Trade decreased cost of living

Distribution of total household welfare gains from the arrival of foreign retail chains in Mexico



Estimated distribution of total welfare gains across the household income distribution. Dashed and light-gray lines correspond to confidence intervals. Welfare gains are expressed as percent of initial household income (i.e. these are proportional gains).



Source: Figure 6 in Atkin, Faber, and Gonzalez-Navarro: "Retail globalization and household welfare: Evidence from Mexico." Journal of Political Economy 126.1 (2018): 1-73

04/10/2018

The Modern Economy

We live in a globalized world

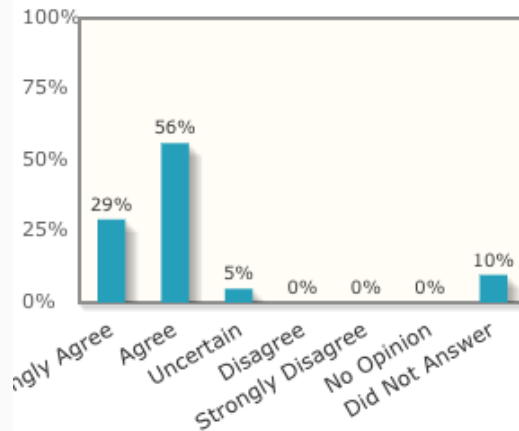
- Our lives are constantly affected by international trade
- A Starbucks coffee that you buy needs inputs that thousands of people in different places have worked on:
 1. You buy your coffee here in Houston from a firm based in Seattle
 2. Starbucks employees brew the coffee
 3. The coffee beans are flown in from Colombia, Brazil, Ethiopia, etc.
 4. The coffee beans were cultivated and collected by farmers in these countries
- This is made possible because of international trade

Economists agree that free trade is good

Question A:

Freer trade improves productive efficiency and offers consumers better choices, and in the long run these gains are much larger than any effects on employment.

Responses

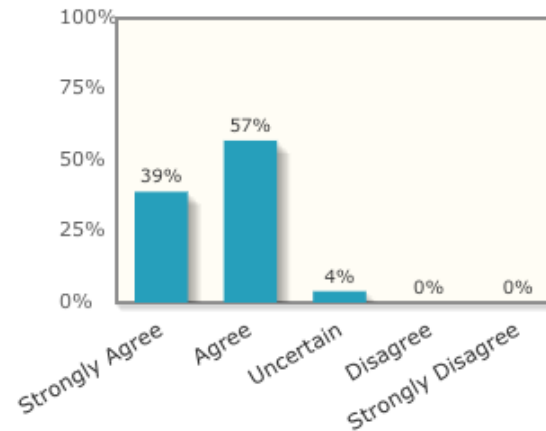


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Source: IGM Economic Experts Panel

www.igmchicago.org/igm-economic-experts-panel

Responses weighted by each expert's confidence



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Source: IGM Economic Experts Panel

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Production Possibilities

Panel (a) shows the production opportunities available to Frank the farmer and Ruby the rancher. Panel (b) shows the combinations of meat and potatoes that Frank can produce. Panel (c) shows the combinations of meat and potatoes that Ruby can produce. Both production possibilities frontiers are derived assuming that Frank and Ruby each work 8 hours per day. If there is no trade, each person's production possibilities frontier is also his or her consumption possibilities frontier.

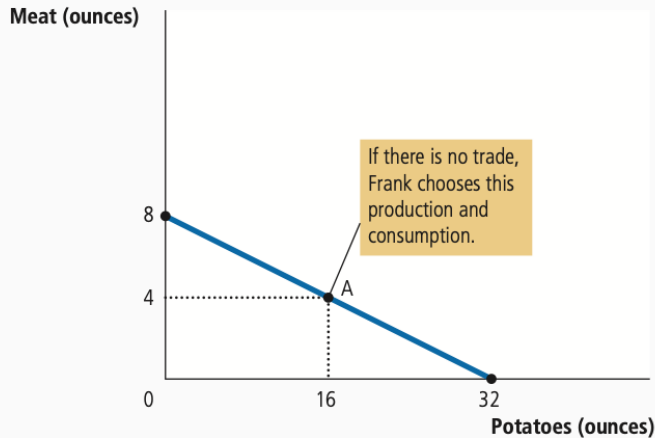
FIGURE 1

The Production Possibilities Frontier

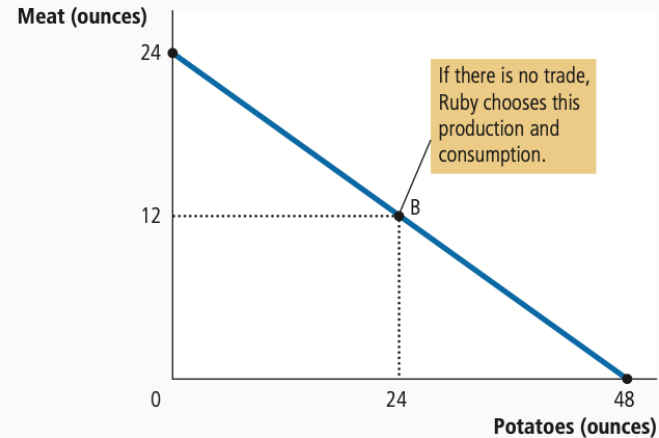
(a) Production Opportunities

	Minutes Needed to Make 1 Ounce of:		Amount Produced in 8 Hours	
	Meat	Potatoes	Meat	Potatoes
Frank the farmer	60 min/oz	15 min/oz	8 oz	32 oz
Ruby the rancher	20 min/oz	10 min/oz	24 oz	48 oz

(b) Frank's Production Possibilities Frontier



(c) Ruby's Production Possibilities Frontier



A few definitions

- *Absolute advantage* is used by economist when the productivity of a firm, person, nation, etc. requires the least number of inputs to produce a good.
- *Opportunity cost* of some item is what we give up to get that item.
- *Comparative advantage* is used when describing the *opportunity cost* faces by two producers. The person that gives up less of good Y to produce good X has a smaller *opportunity cost* of producing X, therefore, they have a comparative advantage.

Examples

Who has an absolute advantage in the production of each good?

Panel (a) shows the production opportunities available to Frank the farmer and Ruby the rancher. Panel (b) shows the combinations of meat and potatoes that Frank can produce. Panel (c) shows the combinations of meat and potatoes that Ruby can produce. Both production possibilities frontiers are derived assuming that Frank and Ruby each work 8 hours per day. If there is no trade, each person's production possibilities frontier is also his or her consumption possibilities frontier.

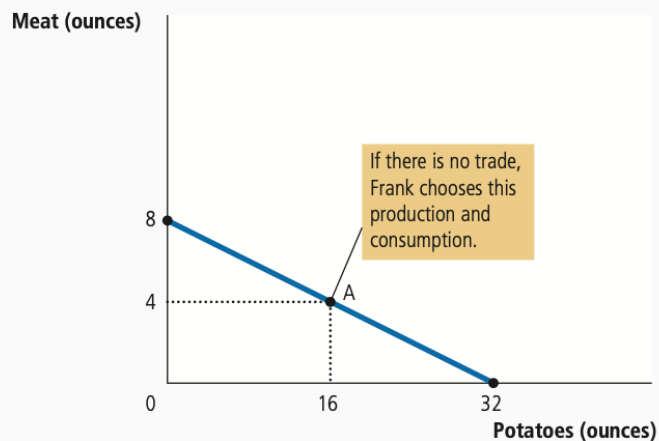
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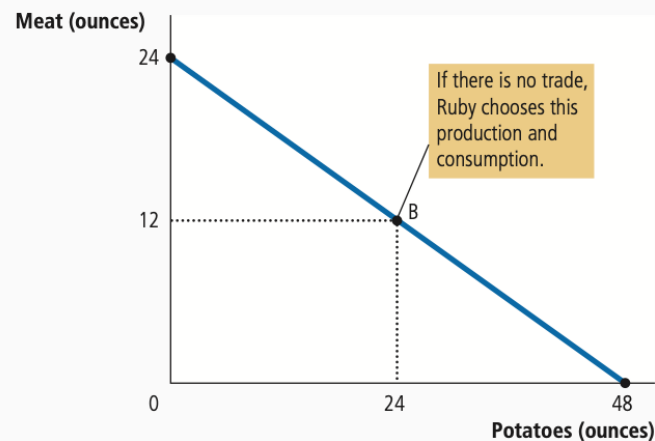
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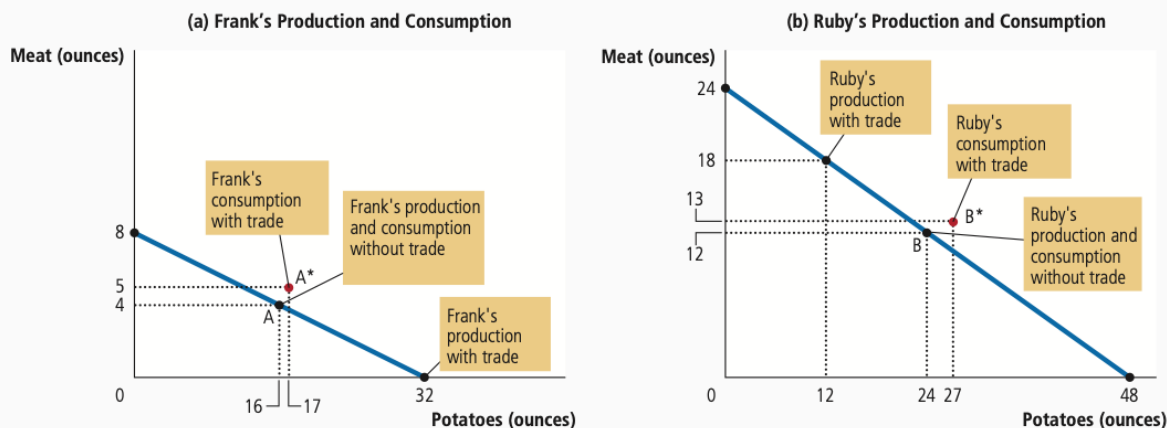
Specialization and Trade

Specialization and Trade

The proposed trade between Frank the farmer and Ruby the rancher offers each of them a combination of meat and potatoes that would be impossible in the absence of trade. In panel (a), Frank gets to consume at point A* rather than point A. In panel (b), Ruby gets to consume at point B* rather than point B. Trade allows each to consume more meat and more potatoes.

FIGURE 2

How Trade Expands the Set of Consumption Opportunities



(c) The Gains from Trade: A Summary

	Frank		Ruby	
	Meat	Potatoes	Meat	Potatoes
Without Trade:				
Production and Consumption	4 oz	16 oz	12 oz	24 oz
With Trade:				
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
GAINS FROM TRADE:				
Increase in Consumption	+1 oz	+1 oz	+1 oz	+3 oz

Interdependence and benefits from trade

TABLE 1

The Opportunity Cost of Meat and Potatoes

	Opportunity Cost of:	
	1 oz of Meat	1 oz of Potatoes
Frank the farmer	4 oz potatoes	$\frac{1}{4}$ oz meat
Ruby the rancher	2 oz potatoes	$\frac{1}{2}$ oz meat

- Franks produces 1 oz of meat in 60 mins and 1 oz of potatoes in 15 mins
 - In the time it takes him to make 1 oz of meat he could make 4 oz of potatoes ($60/15 = 4$)
 - In the time it takes him to make 1 oz of potatoes he could make $\frac{1}{4}$ oz of meat ($15/60 = \frac{1}{4}$)
- Ruby produces 1 oz of meat in 20 mins and 1 oz of potatoes in 10 mins
 - In the time it takes her to make 1 oz of meat she could make 2 oz of potatoes ($20/10 = 2$)
 - In the time it takes her to make 1 oz of potatoes he could make $\frac{1}{2}$ oz of meat ($10/20 = \frac{1}{2}$)

Interdependence and benefits from trade

TABLE 1

The Opportunity Cost of Meat and Potatoes

	Opportunity Cost of:	
	1 oz of Meat	1 oz of Potatoes
Frank the farmer	4 oz potatoes	$\frac{1}{4}$ oz meat
Ruby the rancher	2 oz potatoes	$\frac{1}{2}$ oz meat

- Who has a comparative advantage in producing potatoes?
- Who has a comparative advantage in producing meat?
- With trade, Frank can specialize in producing potatoes and Ruby in producing meat
- For both parties to gain from trade, the price at which they trade must lie between their opportunity costs
- In our example, for trade to happen, the price of meat should be between 2 and 4 oz of potatoes and the price of potatoes should be between $\frac{1}{4}$ and $\frac{1}{2}$ oz of meat
- Frank can then trade 1 oz of meat for a price that's <4 oz of potatoes

Problems and Applications

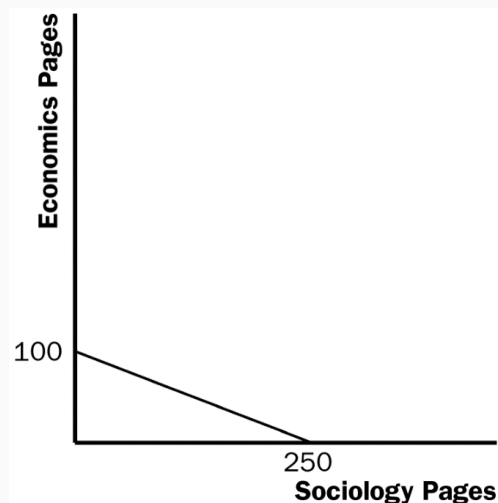
Should LeBron and Taylor Swift mow their lawn?

1. Let's say LeBron and Taylor really enjoy mowing their lawn
2. It takes them 2 hours to do it
3. In 2 hours they can also shoot a Calm ad or record a song that would get them millions
4. They can pay their neighbor \$40 an hour to mow and it takes them 4 hours to do it

Question 1

Maria can read 20 economics pages/hour and 50 sociology pages/hour. She spends 5 hours a day studying.

- Draw Maria's PPF for reading econ and soc
- What is Maria's opportunity cost of reading 100 pages of sociology?



It takes Maria 2 hours to read 100 pages of sociology. In that time, she could read 40 pages of economics. So, the opportunity cost of 100 pages of sociology is 40 pages of economics.

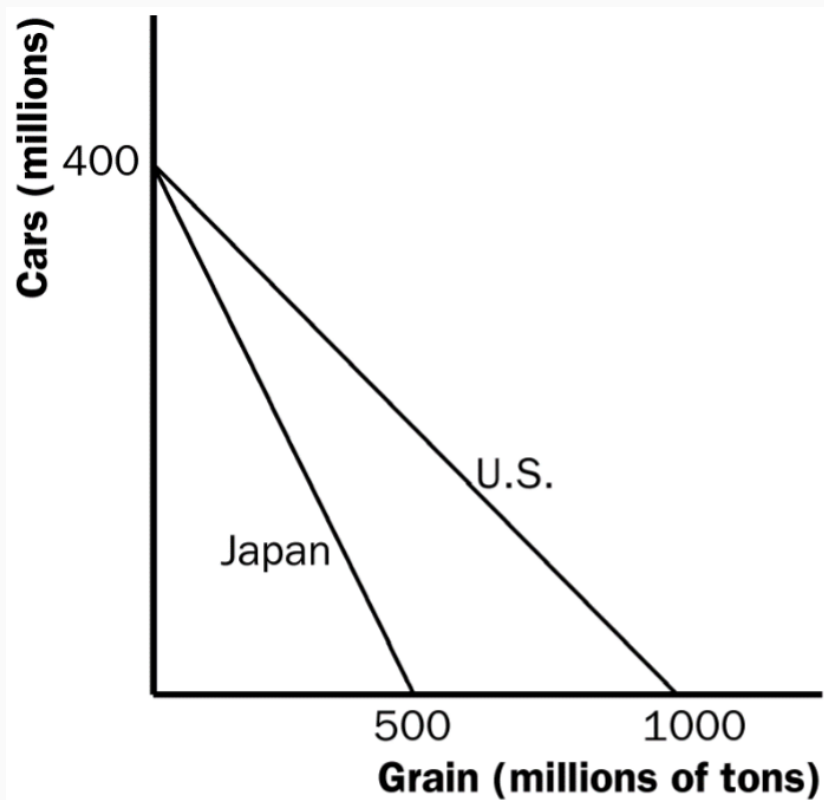
Question 2

American and Japanese workers can produce 4 cars per year. An American worker can produce 10 tons of grain per year, a Japanese worker produces 5 tons per year. Assume there are 100 million workers.

a. Construct a table similar to the table in figure 1

Workers needed to make		
	One Car	One ton of Grain
USA	1/4	1/10
Japan	1/4	1/5

b. Graph the PPF for both countries



c. For the United States, what is the opportunity cost of a car? Of grain? For Japan, what is the opportunity cost of a car? Of grain? Put this information in a table analogous to Table 1

Because a U.S. worker produces either 4 cars or 10 tons of grain, the opportunity cost of one car is 2 1/2 tons of grain, which is 10/4. Similarly, the U.S. opportunity cost of a ton of grain is 2/5 car (4 divided by 10). Because a Japanese worker produces either 4 cars or 5 tons of grain, the opportunity cost of one car is 1 1/4 tons of grain, which is 5/4 and the Japanese opportunity cost of a ton of grain is 4/5 car. This results in the following table:

Opportunity cost of:		
	One car (in terms of tons of grain given up)	One ton of Grain (in terms of cars given up)
USA	2.5	0.4
Japan	1.25	0.8

d. Which country has an absolute advantage in producing cars? In producing grain?

Neither country has an absolute advantage in producing cars, because they are equally productive (the same output per worker); the United States has an absolute advantage in producing grain, because it is more productive (greater output per worker).

e. Which country has a comparative advantage in producing cars? In producing grain?

Japan has a comparative advantage in producing cars, because it has a lower opportunity cost in terms of grain given up. The United States has a comparative advantage in producing grain, because it has a lower opportunity cost in terms of cars given up.

f. Without trade, half of each country's workers produce cars and half produce grain. What quantities of cars and grain does each country produce?

With half the workers in each country producing each of the goods, the United States would produce 200 million cars (50 million workers times 4 cars each) and 500 million tons of grain (50 million workers times 10 tons each). Japan would produce 200 million cars (50 million workers times 4 cars each) and 250 million tons of grain (50 million workers times 5 tons each).

Question 3

Diego and Darnell are roommates. They spend most of their time studying (of course), but they leave some time for their favorite activities: making pizza and brewing root beer. Diego takes 4 hours to brew a gallon of root beer and 2 hours to make a pizza. Darnell takes 6 hours to brew a gallon of root beer and 4 hours to make a pizza.

a. What is each roommate's opportunity cost of making a pizza? Who has the absolute advantage in making pizza? Who has the comparative advantage in making pizza?

Diego's opportunity cost of making a pizza is $\frac{1}{2}$ gallon of root beer, because he could brew $\frac{1}{2}$ gallon in the time (2 hours) it takes him to make a pizza. Darnell's opportunity cost of making a pizza is $\frac{2}{3}$ gallon of root beer, because he could brew $\frac{2}{3}$ of a gallon in the time (4 hours) it takes him to make a pizza. Diego has an absolute advantage in making pizza because he can make one in 2 hours, while it takes Darnell 4 hours. Because Diego's opportunity cost of making pizza is less than Darnell's, Diego has a comparative advantage in making pizza.

b. If Diego and Darnell trade foods with each other, who will trade away pizza in exchange for root beer?

Question 3 (cont.)

c. The price of pizza can be expressed in terms of gallons of root beer. What is the highest price at which pizza can be traded that would make both roommates better off? What is the lowest price? Explain.

The highest price of pizza in terms of root beer that will make both roommates better off is $\frac{2}{3}$ of a gallon of root beer. If the price were higher than that, then Darnell would prefer making his own pizza (at an opportunity cost of $\frac{2}{3}$ of a gallon of root beer) rather than trading for pizza that Diego makes. The lowest price of pizza in terms of root beer that will make both roommates better off is $\frac{1}{2}$ gallon of root beer. If the price were lower than that, then Diego would prefer making his own root beer (he can make $\frac{1}{2}$ gallon of root beer instead of making a pizza) rather than trading for root beer that Darnell makes.

Question 4

Suppose that there are 10 million workers in Canada and that each of these workers can produce either 2 cars or 30 bushels of wheat in a year.

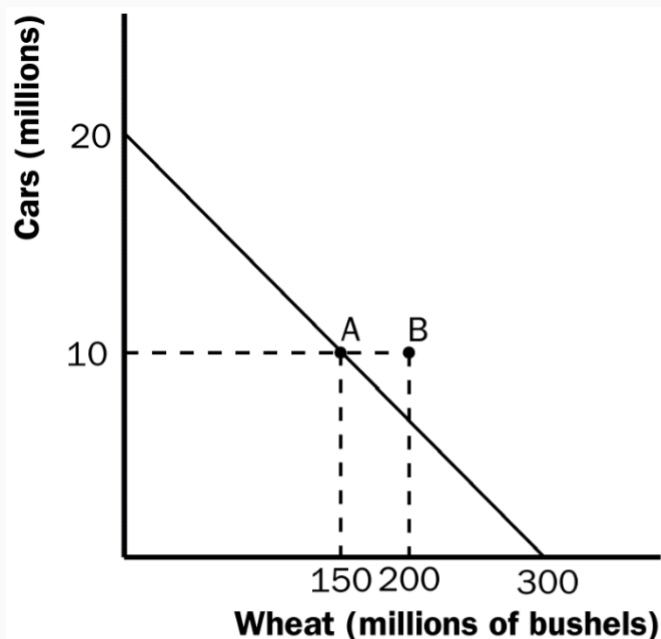
a. What is the opportunity cost of producing a car in Canada? What is the opportunity cost of producing a bushel of wheat in Canada? Explain the relationship between the opportunity costs of the two goods.

Because a Canadian worker can make either 2 cars a year or 30 bushels of wheat, the opportunity cost of a car is 15 bushels of wheat. Similarly, the opportunity cost of a bushel of wheat is $1/15$ of a car. The opportunity costs are the reciprocals of each other.

Question 4 (cont.)

b. Draw Canada's production possibilities frontier. If Canada chooses to consume 10 million cars, how much wheat can it consume without trade? Label this point on the production possibilities frontier.

c. Now suppose that the United States offers to buy 10 million cars from Canada in exchange for 20 bushels of wheat per car. If Canada continues to consume 10 million cars, how much wheat does this deal allow Canada to consume? Label this point on your diagram. Should Canada accept the deal?



Question 5

England and Scotland both produce scones and sweaters. Suppose that an English worker can produce 50 scones per hour or 1 sweater per hour. Suppose that a Scottish worker can produce 40 scones per hour or 2 sweaters per hour.

a. Which country has the absolute advantage in the production of each good? Which country has the comparative advantage?

English workers have an absolute advantage over Scottish workers in producing scones, because English workers produce more scones per hour (50 vs. 40). Scottish workers have an absolute advantage over English workers in producing sweaters, because Scottish workers produce more sweaters per hour (2 vs. 1). Comparative advantage runs the same way. English workers, who have an opportunity cost of $1/50$ sweater per scone (1 sweater per hour divided by 50 scones per hour), have a comparative advantage in scone production over Scottish workers, who have an opportunity cost of $1/20$ sweater per scone (2 sweaters per hour divided by 40 scones per hour). Scottish workers, who have an opportunity cost of 20 scones per sweater (40 scones per hour divided by 2 sweaters per hour), have a comparative advantage in sweater production over English workers, who have an opportunity cost of 50 scones per sweater (50 scones per hour divided by 1 sweater per hour).

Question 5 (cont.)

b. If England and Scotland decide to trade, which commodity will Scotland export to England? Explain.

If England and Scotland decide to trade, Scotland will produce sweaters and export them to England in exchange for scones. A trade with a price between 20 and 50 scones per sweater will benefit both countries, as they will be getting the traded good at a lower price than their opportunity cost of producing the good in their own countries.

c. If a Scottish worker could produce only 1 sweater per hour, would Scotland still gain from trade? Would England still gain from trade? Explain.

Even if a Scottish worker produced just one sweater per hour, the countries would still gain from trade, because Scotland would still have a comparative advantage in producing sweaters. Its opportunity cost for sweaters would be higher than before (40 scones per sweater, instead of 20 scones per sweater before). But there are still gains from trade because England has a higher opportunity cost (50 scones per sweater).

GIF!

