

Brian Rodriguez	Mon 1:00-1:50	137
James Le	Mon 3:00-3:50	138
Iveel Lonjid	Mon 4:00-4:50	024
Sam Dastrup	Tues 8:00-8:50	034
Cynthia Wu	Wed 12:00-12:50	038
Gina Russell	Fri 1:00-1:50	016

Enter the 3-digit TA code in the "Exam Number" boxes

### Chapter 19: Uncertainty and information

- A. Risk and expected value
- B. Risk neutrality and risk aversion
- C. Private information
- D. Insurance markets
- E. Market for loans
- F. Managing risk in financial markets

Suppose you can invest \$100,000 in one of two projects.

- Each project promises you an equal chance of \$50,000 profit or a \$25,000 loss.
- The expected return on each project is  $(\$50,000 \times 0.5) + (-\$25,000 \times 0.5)$ , which is \$12,500.

**Diversified**

- Invest 50 percent of your money in Project 1 and 50 percent in Project 2.

The four possibilities are

- 1. Lose \$12,500 on each project and your return is a loss of \$25,000.
- 2. Earn \$25,000 on Project 1 and lose \$12,500 on Project 2 and your return is \$12,500.
- 3. Lose \$12,500 on Project 1 and earn \$25,000 on Project 2, and your return is \$12,500.
- 4. Earn \$25,000 on each project, and your return is \$50,000.

-Your expected return is now

$$(-\$25,000 \times 0.25) + (\$12,500 \times 0.25) + (\$12,500 \times 0.25) + (\$50,000 \times 0.25)$$

$$= -\$6,250 + \$3,125 + \$3,125 + \$12,500$$
$$= \$12,500.$$

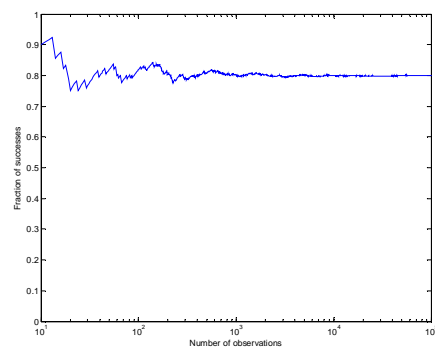
By diversifying your portfolio of assets, you have maintained an expected return of \$12,500.

But you have lowered the chance that you will earn \$50,000 from 0.5 to 0.25.

-You have also lowered the chance that you will lose \$25,000 from 0.5 to 0.25.

-And you have increased the chance that you will earn your expected return of \$12,500 from 0 to 0.5.

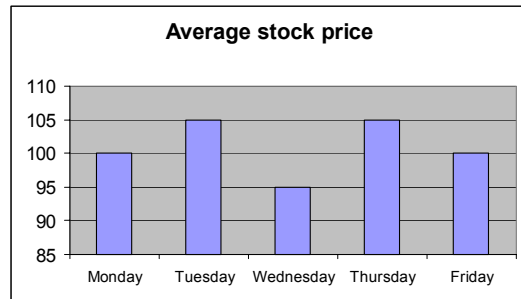
That diversification reduces risk is an implication of the law of large numbers



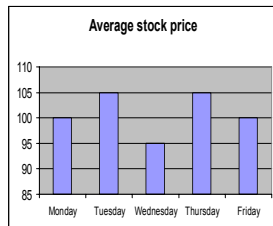
How to play the stock market and walk away with a small fortune

Start with a big fortune

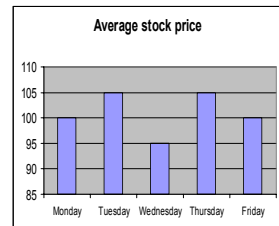
Suppose instead I'd claimed to have found the following pattern



Then you should sell on Tuesdays at 105  
Buy on Wednesdays at 95  
Sell on Thursdays at 105



But if people follow this advice, it would make the price on Tuesday lower than 105  
And it would make the price on Wednesday higher than 95  
And reduce the price on Thursday

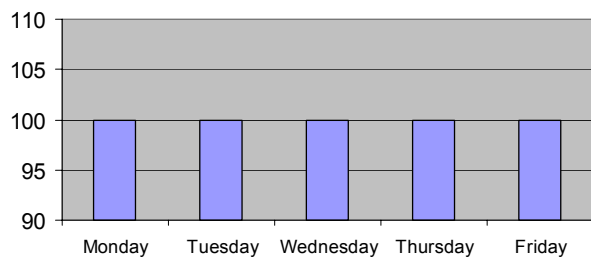


- Efficient markets theory: there should be no **predictable** movements in stock prices
- The change on Tuesday should be driven by Tuesday news that was impossible to predict on Monday

## Managing Risk in Financial Markets

- So an efficient market has two features:
  - 1. Its price equals the expected future price and embodies all the available information.
  - 2. No *forecastable* profit opportunities are available.
- The key thing to understand about an efficient market is that:
  - If something can be anticipated, it will be, and the anticipation of a future event will affect the *current* price.

**Average stock price**



- It's very clear that diversification can reduce risk
- It's not clear that anyone can really predict the stock market

## Chapter 20: Trading with the World

## Chapter 20: Trading with the World

- A. The production possibilities frontier  
1. The two-worker production possibilities frontier

Consider a country (called “Brazil”) with only two workers (called “Carlos” and “Maria”) producing only two goods (called “coffee” and “computers”)

- Carlos could produce either 100 pounds of coffee or 1 computer each week
- Maria could produce either 100 pounds of coffee or 2 computers each week
- Both Carlos and Maria work 50 weeks each year
- Question: what combinations of coffee and computers is it possible for Brazil to produce in a year?

Possibility A: both Carlos and Maria work all the time producing coffee

- Carlos (50 weeks x 100 pounds/week) produces 5,000 pounds of coffee
- Maria (50 weeks x 100 pounds/week) produces 5,000 pounds of coffee
- Brazil in this plan would produce 10,000 pounds of coffee each year

Possibility B: both Carlos and Maria work all the time producing computers

- Carlos (50 weeks x 1 computer/week) produces 50 computers per year
- Maria (50 weeks x 2 computers/week) produces 100 computers per year
- Brazil in this plan would produce 150 computers each year

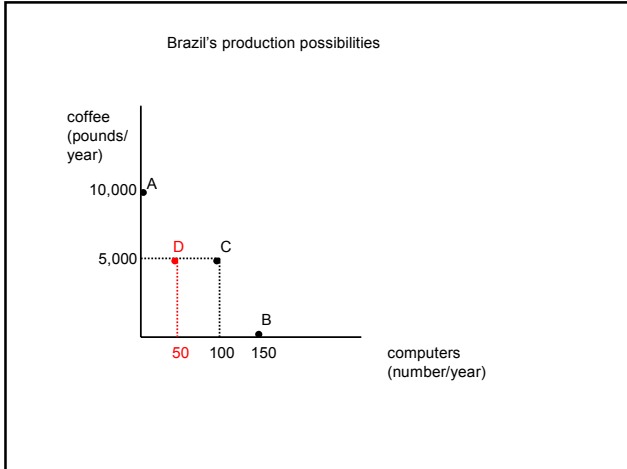
Possibility C: Carlos works all the time producing coffee and Maria works all the time producing computers

- Carlos (50 weeks x 100 pounds/week) produces 5,000 pounds of coffee per year
- Maria (50 weeks x 2 computers/week) produces 100 computers per year
- Brazil in this plan would produce 5,000 pounds of coffee and 100 computers each year

Possibility D (a dumb way to do things): Carlos works all the time producing computers and Maria works all the time producing coffee (dumb because Maria's the good one at making computers)

- Carlos (50 weeks x 1 computer/week) produces 50 computers per year
- Maria (50 weeks x 100 pounds/week) produces 5,000 pounds of coffee per year
- Brazil in this (dumb) plan would produce 5,000 pounds of coffee and 50 computers each year

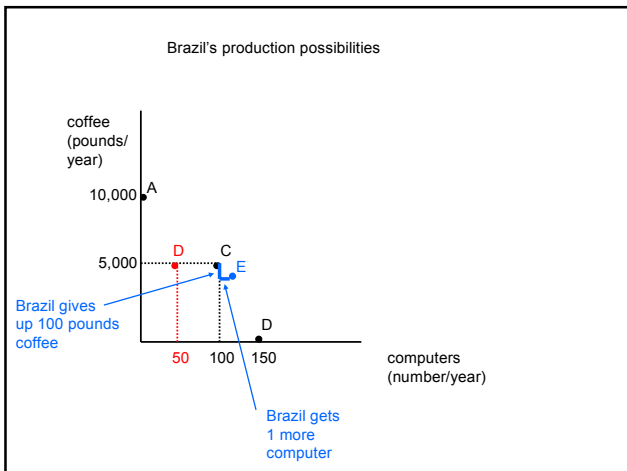
- Possibility A (whole country specializes in coffee): Brazil produces 10,000 pounds of coffee each year
- Possibility B (whole country specializes in computers): Brazil produces 150 computers each year
- Possibility C (Carlos specializes in coffee and Maria specializes in computers): Brazil produces 5,000 pounds of coffee and 100 computers each year
- Possibility D (Carlos specializes in computers and Maria specializes in coffee): Brazil produces 5,000 pounds of coffee and 50 computers each year



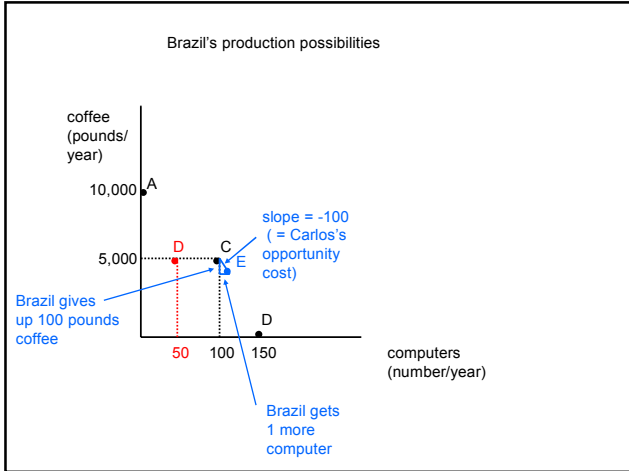
There are many other possibilities, for example—

Possibility E: Carlos works all but one week on coffee, Maria works all year on computers

- Carlos produces (49 weeks x 100 pounds/week) 4,900 pounds coffee and (1 week x 1 computer/week) 1 computer
- Maria produces (50 weeks x 2 computers/week) 100 computers per year
- Brazil produces 4,900 pounds coffee and 101 computers per year



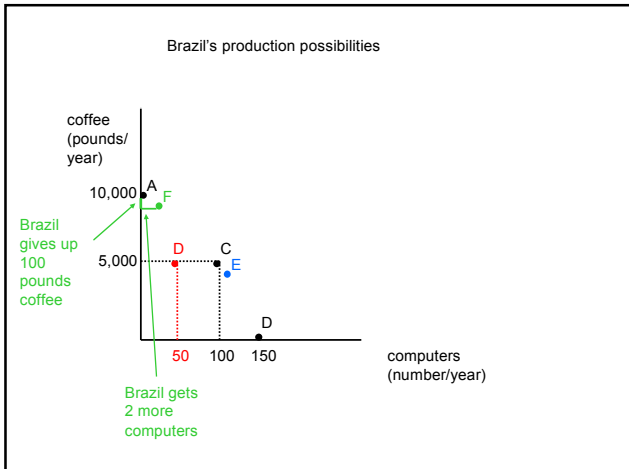
- Carlos could produce 1 more computer by producing 100 pounds less of coffee
- Carlos's *opportunity cost* of producing another computer is 100 pounds of coffee
- In general, the opportunity cost of getting one more unit of the good on the horizontal axis is calculated as (loss in variable on vertical axis) divided by (gain in variable on horizontal axis)



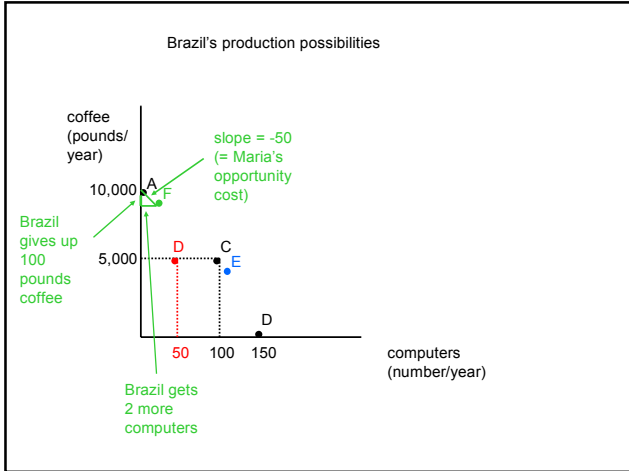
One last example—

Possibility F: Carlos works all year on coffee, Maria works one week on computers and rest on coffee

- Carlos produces (50 weeks x 100 pounds/week) 5,000 pounds coffee
- Maria produces (49 weeks x 100 pounds/week) 4,900 pounds coffee and (1 week x 2 computers/week) 2 computers
- Brazil produces 9,900 pounds coffee and 2 computers per year

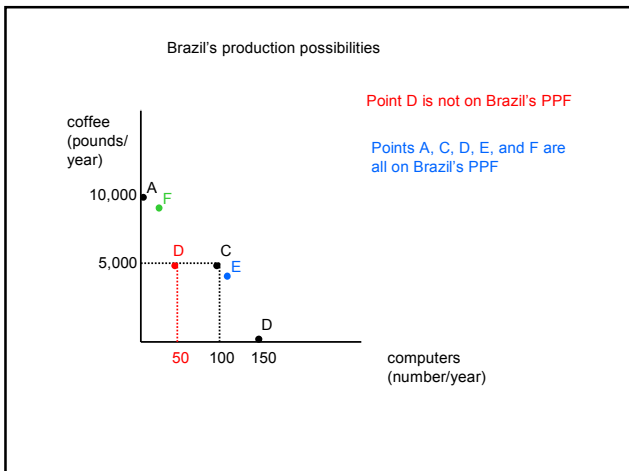


- Maria could produce 2 more computers by producing 100 pounds less of coffee
- Maria's opportunity cost of producing one more computer is 50 pounds of coffee
- calculated as 100 pounds coffee divided by 2 more computers

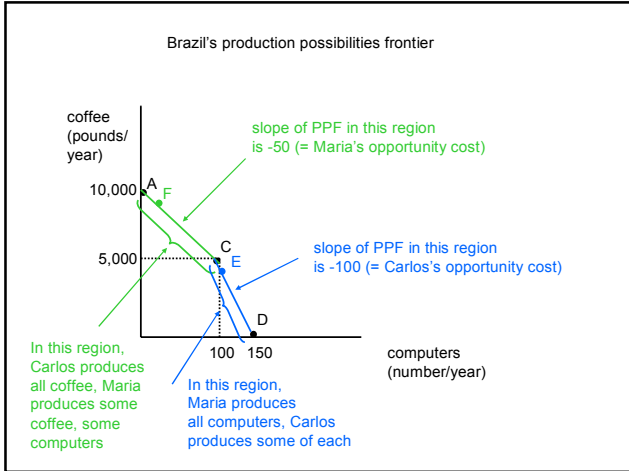


Definition:

A given production plan is said to be a point on Brazil's *production possibilities frontier* if there is no way to produce more of one good without producing less of some other good

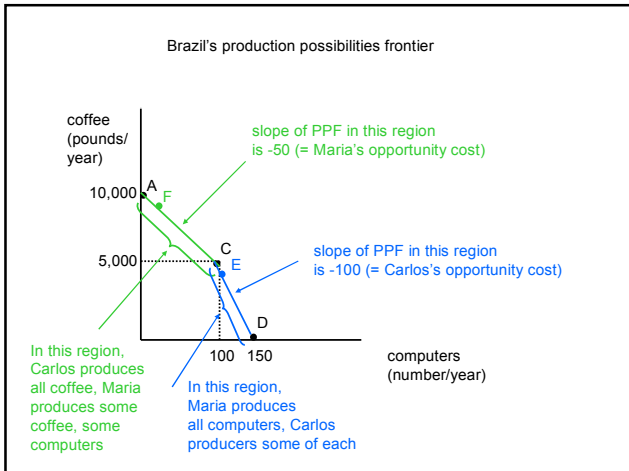


- Being on the PPF requires that those resources devoted to computer production are those with the lowest opportunity cost of producing computers
- In this economy, being on the PPF requires that the first computers are made by Maria, not Carlos



**Observation:**

The slope of the production possibilities frontier is the opportunity cost to Brazil of producing more computers  
 = how much coffee Brazil would have to give up to produce one more computer



**Summary:**

- Brazil's production possibilities frontier represents possibilities for how much of each of the different goods Brazil could efficiently produce on its own
- The slope of the PPF is Brazil's opportunity cost of producing more computers (the good on the horizontal axis)

## Chapter 20: Trading with the world

- A. The production possibilities frontier
1. The two-worker production possibilities frontier
  2. The three-worker production possibilities frontier

In one week:

- Maria could produce 2 computers or 100 pounds coffee
- Carlos could produce 1 computer or 100 pounds coffee
- Pedro could produce 3 computers or 200 pounds coffee

Production possibilities frontier:

- One possibility is that everybody just produces coffee
- Under this Possibility A, Carlos and Maria would each produce (50 weeks x 100 pounds/week) 5,000 pounds of coffee and Pedro would produce (50 weeks x 200 pounds/week) = 10,000 pounds of coffee
- Brazil overall would produce 20,000 pounds of coffee each year for Possibility A

If Brazil were to shift one person to one week of computer production, who should it be?

- If Maria, Brazil loses 100 pounds coffee and gains 2 computers (Maria's OC = 50 pounds of coffee per computer)
- If Carlos, Brazil loses 100 pounds coffee and gains 1 computer (Carlos's OC = 100 pounds of coffee per computer)
- If Pedro, Brazil loses 200 pounds coffee and gains 3 computers (Pedro's OC = 67 pounds of coffee per computer)
- Pedro has an *absolute advantage* over Maria at making computers, but Maria has a *comparative advantage* over Pedro at making computers

Conclusion: if Brazil wants to make one more computer, best plan is to have Maria make it (only give up 50 pounds coffee)

