A Robinson Crusoe Model of
Specialization and Gains from Trade

In this chapter we're examining the mechanisms of trade and the benefits of allowing people to trade. Here is one (long, but not difficult) numerical example about trade, based on what is sometimes called the **Robinson Crusoe model** of an economy.

Imagine that Alice and Bob are stranded on a desert island. For food, they must either hunt fish or gather wild vegetables. Assume that they each have 6 hours total to devote to finding food each day, and assume that they really like a balanced diet: at the end of the day, they each want to have equal amounts of fish and vegetables to eat. We are going to examine the circumstances under which they can gain from trade.

Story #1: Imagine that Alice is better than Bob at fishing (she can catch 2 fish per hour, and he can only catch 1 per hour) and that Bob is better than Alice at gathering wild vegetables (he can gather 2 per hour, and she can only gather 1). Economists would say that Alice has an **absolute advantage** over Bob in fishing and that Bob has an absolute advantage over Alice in gathering vegetables. Intuitively, do you think they can gain from trade? (Just guess!) Now, let's find out for sure:

1. If Alice and Bob could not trade (e.g., because they were on different islands), how many hours would Alice spend on each activity, and how much of each type of food would she end up with? How many hours would Bob spend on each activity, and how much of each type of food would he end up with? (Hint: Just play with the numbers, remembering that they each have six hours and want to get equal amounts of fish and vegetables.)

2. Now, imagine that Alice and Bob can trade with each other. Consider the following proposal: Alice will specialize in fishing, and Bob will specialize in gathering vegetables. After they each devote six hours to their respective specialties, they trade with each other as follows: Alice gives half her fish to Bob, and Bob gives half his vegetables to Alice. How many fish and how many vegetables will they each end up with in this case?

3. Is this a Pareto improvement over the no-trade result in question 1?

Story #2: Now, imagine that Alice is better than Bob at fishing (she can catch 6 fish per hour, and he can only catch 1 per hour) and that Alice is also better than Bob at gathering wild vegetables (she can gather 3 per hour, and he can only gather 2). Economists would say that Alice has an absolute advantage over Bob in both fishing and gathering vegetables. Intuitively, do you think they can gain from trade? (Just guess!)

Now, let's find out for sure:

4. If Alice and Bob could not trade (e.g., because they were on different islands), how many hours would Alice spend on each activity, and how much of each type of food would she end up with? How many hours would Bob spend on each activity, and how much of each type of food would he end up with?

5. Now, imagine that Alice and Bob can trade with each other. Consider the following proposal: Alice will specialize in fishing, increasing the amount of time that she spends fishing to 3 hours (leaving her with 3 hours to gather vegetables); and Bob will specialize in gathering vegetables, increasing the amount of time that he spends gathering vegetables to 5 hours (leaving him 1 hour to fish). After they each devote six hours as described above, they will trade with each other as follows: Alice gives 5 fish to Bob, and Bob gives 4 vegetables to Alice. How many fish and how many vegetables will they each end up with in this case?

6. Is this a Pareto improvement over the no-trade result in question 4?

Now: Forget about possible trades and think back to Alice and Bob's productive abilities.

7. What is Alice's cost of vegetables in terms of fish? (In other words, how many fish must she give up in order to gain an additional vegetable? To figure this out, calculate how many minutes it takes Alice to get one vegetable, and how many fish she could get in that time. Fraction are okay.) What is Alice's cost of fishing in terms of vegetables?

8. What is Bob's cost of fishing in terms of vegetables? What is Bob's cost of vegetables in terms of fish?

9. In terms of vegetables, who is the least-cost producer of fish? In terms of fish, who is the least-cost producer of vegetables?

The punch line: Having each party devote more time to their least-cost product is the concept of **comparative advantage**.