## Comparative Advantage and Trade

The ideas and structure of this reading are adapted from *Microeconomics* (1<sup>st</sup> ed.) by Paul Krugman and Robin Wells (New York: Worth Publishers, 2005). I simplified some of it.

[An important principle of economics is] that of *gains from trade*—the mutual gains that individuals can achieve by specializing in doing different things and trading with one another. Our second illustration of an economic model [the first was the production possibility frontier] is a particularly useful model of gains from trade—trade based on *comparative advantage*.

[Suppose there are two castaways on an island: Tom and Hank.] Can they benefit from trading with each other?

It's obvious that there will be potential gains from trade if the two castaways do different things particularly well. For example, if Tom is a skilled fisherman and Hank is very good at climbing trees, clearly it makes sense for Tom to catch fish and Hank to gather coconuts—and for the two men to trade the products of their efforts.

But one of the most important insights in all of economics is that there are gains from trade even if one of the trading parties isn't especially good at anything. Suppose, for example, that Hank is less well suited to primitive life than Tom; he's not nearly as good at catching fish, and compared to Tom even his coconut-gathering leaves something to be desired. Nonetheless, what we'll see is that both Tom and Hank can live better by trading with each other than either could alone.



In this simplified PPF, each fish always has the opportunity cost to Tom of <sup>3</sup>/<sub>4</sub> of a coconut.



In this simplified PPF, each fish always has the opportunity cost to Hank of 2 coconuts.

Hank is less productive all around: at most he can produce 10 fish or 20 coconuts. But he is particularly bad at fishing; whereas Tom sacrifices <sup>3</sup>/<sub>4</sub> of a coconut per fish caught, for Hank the opportunity cost of a fish is 2 whole coconuts. The table summarizes the two castaways' opportunity costs for fish and coconuts:

	Tom's Opportunity Cost	Hank's Opportunity Cost
One fish	<sup>3</sup> ⁄4 coconut	2 coconuts
One coconut	4/3 fish	½ fish

Now Tom and Hank could go their separate ways, each living on his own side of the island, catching his own fish and gathering his own coconuts. Let's suppose that they start out that way and make the consumption choices shown in the two PPF's above: in the absence of trade, Tom consumes 28 fish and 9 coconuts per week, while Hank consumes 6 fish and 8 coconuts. [Sucks for Hank.]

But is this the best they can do? No, it isn't.

Given that the two castaways have different opportunity costs, they can strike a deal that makes both of them better off.

The table below shows how such a deal works: Tom specializes in the production of fish, catching 40 per week, and gives 10 to Hank. Meanwhile, Hank specializes in the production of coconuts, gathering 20 per week, and gives 10 to Tom.

Without Trade		With Trade		Gains from Trade		
		Production	Consumption	Production	Consumption	
Tom	Fish	28	28	40	30	+2
	Coconuts	9	9	0	10	+1
Hank	Fish	6	6	0	10	+4
	Coconuts	8	8	20	10	+2

Tom now consumes more of both goods than before: instead of 28 fish and 9 coconuts, he consumes 30 fish and 10 coconuts. And Hank also consumes more, going from 6 fish and 8 coconuts to 10 fish and 10 coconuts. Both experience gains from trade: Tom's consumption of fish increases by two, and his consumption of coconuts increases by one. Hank's consumption of fish increases by four, and his consumption of coconuts by two.

So both castaways are better off when they each specialize in what they are good at and trade. It's a good idea for Tom to catch the fish for both of them because his opportunity cost of a fish is only <sup>3</sup>/<sub>4</sub> of a coconut not gathered versus 2 coconuts for Hank. Correspondingly, it's a good idea for Hank to gather coconuts for the both of them.

Or we could put it the other way around: Because Tom is so good at catching fish, his opportunity cost of gathering coconuts is high: 4/3 fish not caught for every coconut gathered. Because Hank is a pretty poor fisherman, his opportunity cost of gathering coconuts is much less, only  $\frac{1}{2}$  a fish per coconut.

What we could say in this case is that Tom has a **comparative advantage** in catching fish and Hank has a comparative advantage in gathering coconuts. An individual has a comparative advantage in producing something if the opportunity cost of that production is lower for that individual than for other people. In other words, Hank has a comparative advantage over Tom in producing a particular good or service if Hank's opportunity cost of producing that good or service is lower than Tom's.

The story of Tom and Hank clearly simplifies reality. Yet it teaches us some very important lessons that apply to the real economy, too.

First, the model provides a clear illustration of the gains from trade: by agreeing to specialize and provide goods to each other, Tom and Hank can produce more and therefore both be better off than if they tried to be self-sufficient.

Second, the model demonstrates a very important point that is often overlooked in real-world arguments: as long as people have different opportunity costs, *everyone has a comparative advantage in something, and everyone has a comparative disadvantage in something.* 

Notice that in our example Tom is actually better than Hank at producing both goods: Tom can catch more fish in a week, and he can also gather more coconuts. That is, Tom has an **absolute advantage** in both activities: he can produce more output with a given amount of input

(in this case, his time) than Hank. You might therefore be tempted to think that Tom has nothing to gain from trading with the less competent Hank.

But we've just seen that Tom can indeed benefit from a deal with Hank because *comparative*, not *absolute*, advantage is the basis for mutual gain. It doesn't matter that it takes Hank more time to gather a coconut; what matters is that for him the opportunity cost of that coconut in terms of fish is lower. So Hank, despite his absolute disadvantage, even in coconuts, has a comparative advantage in coconut gathering. Meanwhile Tom, who can use his time better by catching fish, has a comparative *dis*advantage in coconut-gathering.

If comparative advantage were relevant only to castaways, it might not be that interesting. In fact, however, the idea of comparative advantage applies to many activities in the economy. Perhaps its most important application is to trade—not between individuals, but between countries.

## Questions

A. Imagine a country with two farmers, George and Jim. Each farmer has 1000 acres. The land can be used either for growing wheat or for raising cattle. George's land is better than Jim's. The graphs below indicate the bushels of wheat or pounds of beef produced per acre on each of their farms. [Note: I swiped this example from the website of the UCSD Economics Department.]



- 1. Who has absolute advantage in the production of wheat? of beef?
- 2. Who has comparative advantage in wheat? in beef?
- 3. Is there an opportunity for trade here? If no, why not? If yes, on what terms might a fair trade be arranged?

B. Imagine that the US and Canada both produce only two goods: pork and airplanes. Here is the PPF for each nation.



- 1. What should the US produce? What should Canada produce? Why?
- 2. Should the two nations trade with each other? Why or why not?

## ANSWERS

A

- 1. George
- 2. George has comparative advantage in wheat, Jim has comparative advantage in beef.
- 3. There is an opportunity for trade.

Without Trade		With Trade		Gains from Trade		
		Production	Consumption	Production	Consumption	
George	Wheat	70	70	100	72	+2
	Beef	20	20	0	25	+5
Jim	Wheat	20	20	0	28	+8
	Beef	30	30	60	35	+5

## В

1. US: Each million tons of pork has the opportunity cost of 500 airplanes Canada: Each million tons of pork has the opportunity cost of 2,000 airplanes

US: Each airplane has the opportunity cost of .002 tons of pork Canada: Each airplane has the opportunity cost of .0005 tons of pork.

The opportunity cost of increasing pork production is higher for Canada, so they should produce planes. The opportunity cost of increasing aircraft production is higher for the US, so they should raise hogs.

2. Of course they should. If only pigs could fly....