Econ 301, chapter 32, Production and exchange

**Robinson Crusoe Economy**

The picture above implies that the MRS = MP at the Robinson Crusoe point of optimum.

Now we introduce the firm which maximizes profit \( \pi = pC - wL \) when \( MP = w/p \)

Note \( dC/dL = f' = MPL = w/p \) at the point of optimum.

Robinson's U-max (below) happens when MRS = w/p
The "Whole" Story (below): At competitive equilibrium, $MP = \frac{w}{p} = MRS$

Now for the fun of it, consider the disequilibrium below. What do you see here? Mark the demands and supplies.
Here is a new model with two goods (1 and 2), two traders (A and B), and one input (L).

The slope of the production possibilities curve (ppc) is called the marginal rate of transformation, MRT, and it equals \(-\frac{MP_{L2}}{MP_{L1}}\). The ppc will be concave from below if the two production functions look like F in the cases we have already considered. I’ll show you why in class.

Pareto efficiency requires that MRS = MRT as you see in the figure below.
How do we know that we are not at an optimum unless the $\text{MRS} = \text{MRT}$? Here’s sketch of a proof:

Suppose traders A and B specialize, so A produces only good 1 and B only good 2. And this is a capitalist/private property economy where they can keep what they make. Their joint output lands them at point D on the ppf, and this point determines the dimensions of the Edgeworth box shown. The initial endowment point is W, where A initially has all the good 1 and B all the good 2. If they traded to the contract curve (CC), they would go to what looks like a Pareto Optimum at point C...but is it? Is there any way they could be a little smarter and both end up better off? Yes.

Notice that at point C they would both be willing to trade 1 unit of good 1 for 1 unit of good 2. Notice also, and this is key, when they sit at D on the ppf, if they took enough of B’s labor out of the production of 1 unit of good 2 and used it to produce good 1, they would get 2 more units of good 1.

Now, and here’s the other key, if they did this, collectively, they would have 1 less good 2, but they would have 2 more good 1’s. Suppose they split this evenly, so they both gave up 1/2 unit of good 2 and got 1 more unit of good 1. How would they feel about that? They would both be better off. A would move to higher $U$ along the red arrow, and B would move to higher $U$ along the green arrow. We would end up with a new Edgeworth box with its upper right corner moved down and right from point D on the ppf. In the end, the new picture would look like the one on the previous page, where $\text{MRS} = \text{MRT}$.
And further, in the marketplace, when households max U, we get $p_1/p_2 = MRS$, and when firm’s max profits we get $p_1/p_2 = MRT$. Ergo...markets get up to Pareto opt. It’s that prices as drums idea again.