

LECTURE 14: PRODUCTION POSSIBILITIES FRONTIER

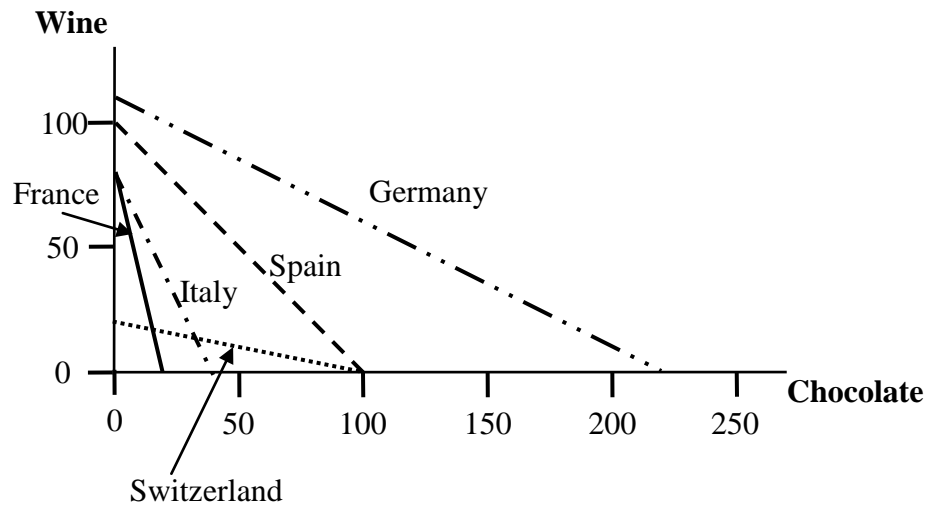
- I. Two Kinds of Efficiency
 - a. To represent an economy, we can draw “production possibilities frontiers”. A production possibility frontier (PPF) illustrates combinations of goods and/or services an economy could produce while using all available inputs.
 - b. Points along the PPF are possible and efficient (in the sense there is no unutilized inputs). We call these points “productively efficient.”
 - i. Points beyond the PPF are not possible.
 - ii. Points within the PPF are not productively efficient.
 - c. Just because a country’s using all inputs doesn’t mean it’s using all of them wisely. A country that makes only sweaters will have nothing to eat! When an economy produces an optimal bundle of goods and services, we call that “allocative efficiency.” Debates about economic issues—how much to spend on military or education, for example—are ultimately debates about what is allocatively efficient.

- II. Graphing a PPF

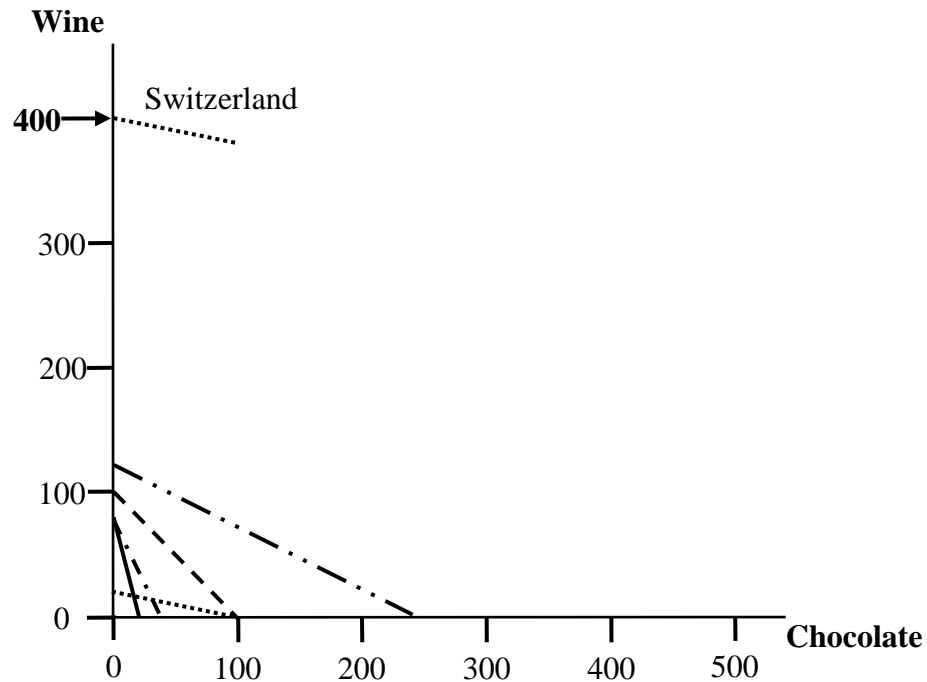
- a. To begin, let’s graph each country. As a reminder, here’s the table from last class:

| <i>Country</i> | <i>Maximum Wine (barrels)</i> | <i>Maximum Chocolate (pounds)</i> |
|----------------|-----------------------------------|---------------------------------------|
| France | 80 | 20 |
| Germany | 120 | 240 |
| Switzerland | 20 | 100 |
| Spain | 100 | 100 |
| Italy | 80 | 40 |

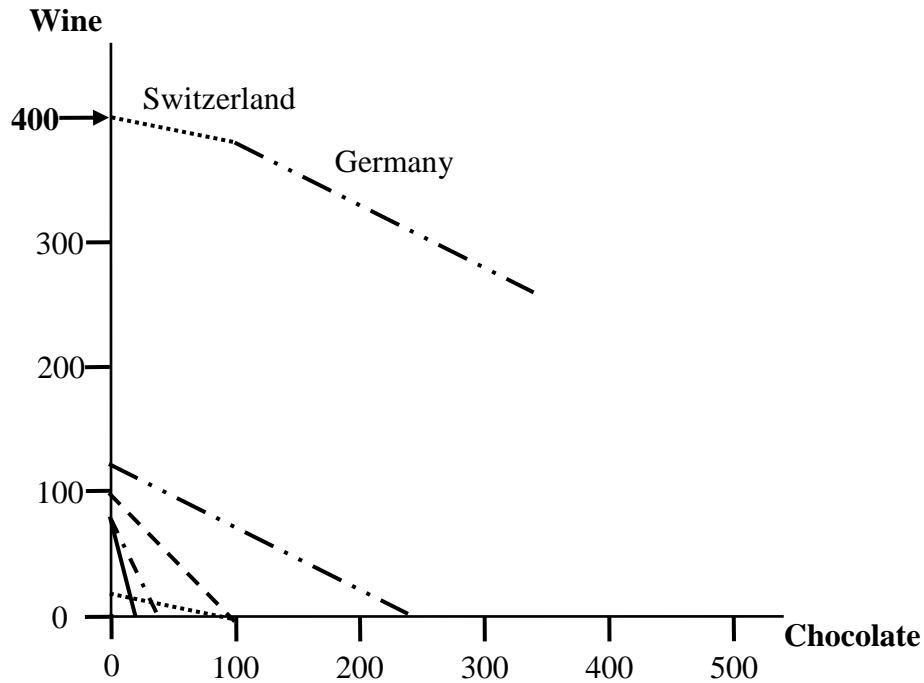
- b. In our graph, the axes are quantities of each good, with one good being the price—the opportunity cost—of the other good. Note that Germany’s line is way out there; that’s because it has the absolute advantage in both goods.
- c. You can think of each of these lines as a simplified version of a country’s PPF. Germany could produce 120 barrels of wine and nothing else. It could make 100 barrels of wine and 40 pounds of chocolate. Or 60 barrels of wine and 120 pounds of chocolate. Or 240 pounds of chocolate and nothing else.



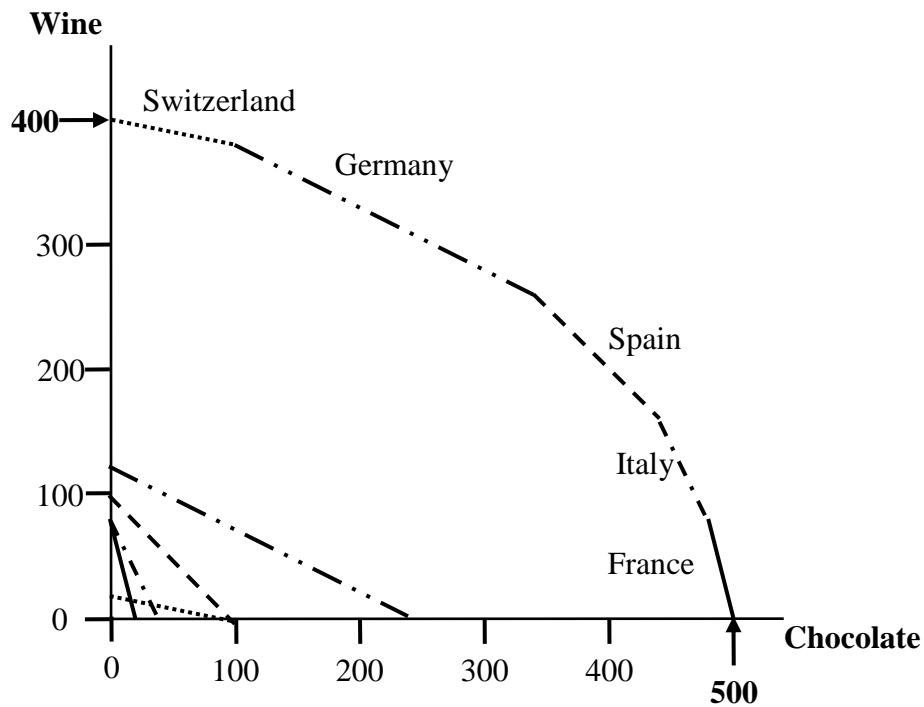
- d. That is busy! Instead, let's graph all five countries in one line. Imagine all five countries made wine. That means, together, they'd make 400 barrels. (We'll have to zoom out to get 400 in range.)
- e. If we wanted some chocolate, which country should switch out of wine first and start making chocolate? The one with the comparative advantage of course! Recall that was Switzerland. So we copy/paste Switzerland's PPF and place it next to the 400.



- f. At most, Switzerland can make 600 pounds of chocolate. What if we wanted 700? Which country would make that other 100 pounds?
 - i. Who second place for comparative advantage in chocolate?



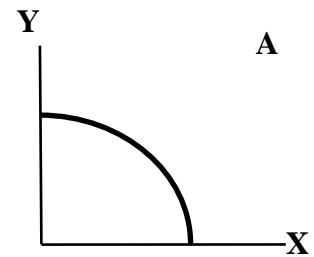
- ii. It cost Switzerland just 0.2 barrels of wine to make a pound of chocolate and it cost Germany 0.5 barrels of wine to make a pound of chocolate. Germany is runner-up.
- g. To complete the graph, we continue to the next-most expensive and so on until...



- h. Note 500 is how many pounds of chocolate all five countries would make if they did nothing but make chocolate.

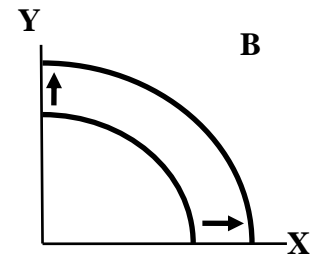
III. Shifting a PPF

- a. In general, PPFs have a concave shape and this shape originates from a key idea from Unit I: increasing marginal cost (or diminishing marginal returns; it depends on if you think in terms of more input for a given output or less output for a given input. But these approaches are equivalent).



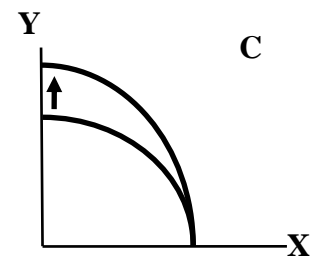
- b. A standard PPF looks like this (A), with each axis representing desirable and mutually exclusive options.

- c. The PPF reminds acts as a nice introduction to thinking about economic growth because we can shift it.



- i. When an event improves the ability to make more of the stuff on each axis, the curve shifts as illustrated (B).

- ii. When an event improves the ability to make more of the stuff on only one axis, the curve shifts as illustrated (C).



- iii. The opposite occurs when an event reduces productive capacity.

- d. Consider food production. GMOs drastically increase food production but don't increase the productivity of other goods, like art, health care, or education. If we imagine a PPF with "Food" on the x-axis and "Everything Else" on the y-axis, GMOs would change the PPF as illustrated.

- e. In this example, I radically increased potential food production. But that doesn't mean the country (or the world) produces a lot more food. Because food production is so much better, a country can provide the same amount of food as before and make a lot more of everything else. If the country was at Point A, it could move to Point B. It could even move to Point C and produce less food. What it does depends on what's allocatively efficient. But GMOs allow better bundles of production to be options.

