Background source material:
David Ricardo, On the Principles of Political Economy and Taxation, Chapter 7: On Foreign Trade
http://www.econlib.org/library/Ricardo/ricP2a.html

Economic Content: Traditional Presentation of Comparative Advantage

A. Introduction: David Ricardo is credited with being the first economist to systematically consider how two economies can benefit if they choose to trade. He suggested that if one country could produce an item at lower opportunity cost than another country and the other country could produce a different item at a lower opportunity cost both could benefit by trading some of the good that they were better at producing for some of the good the other country was better at producing.

   The ability to produce a good at a lower opportunity cost is called "Comparative Advantage". Ricardo demonstrated that comparative advantage is more important in determining the benefits of trade than which country can produce more of a good (called "Absolute Advantage"). In fact, comparative advantage explains why a relatively large country may benefit from trading with a relatively small country even if the larger country could produce more of anything that the smaller country could produce.

B. Consider two countries, Great Britain and Spain. Both produce only two commodities, Wool and Wine. Quantities of wool will be measured in metric tons per year. Quantities of wine will be measured in thousands of liters (kiloliters) per year. Note: For the sake of simplicity we assume each country produces no other goods or services with its resources.

C. Production Possibilities Schedules: The following two tables present the two countries possible combinations of wine and wool that they can produce on their own in a year given their available resources and technologies.

   a. Table 1: Great Britain's Production Possibilities Schedule

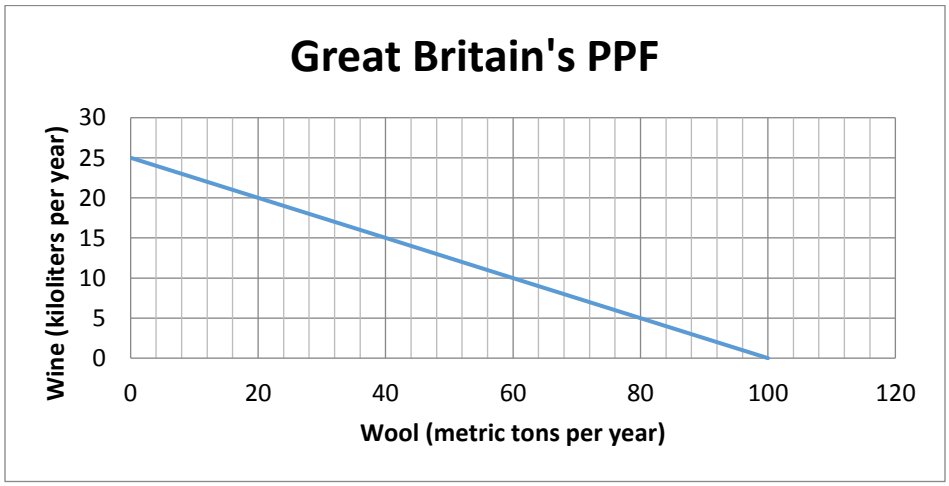
Great Britain	
Wool (tons)	Wine (kiloliters)
100	0
80	5
60	10
40	15
20	20
0	25

b. Table 2: Spain's Production Possibilities Schedule

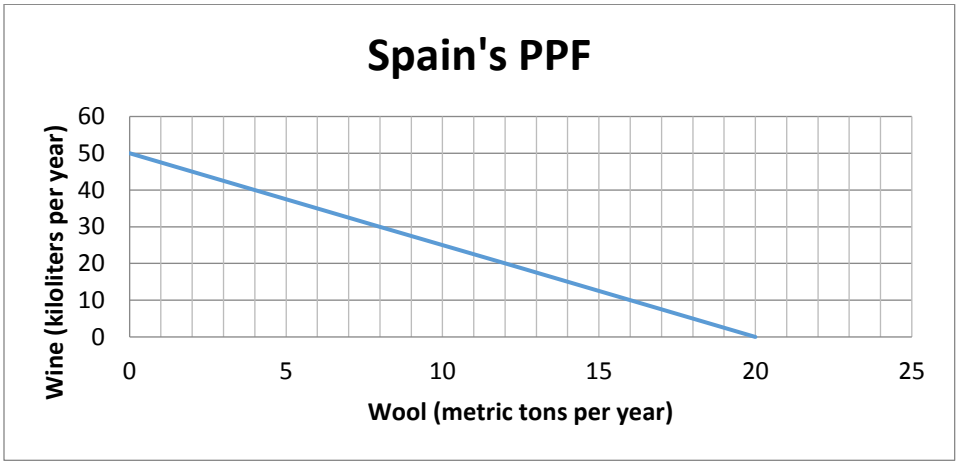
Spain	
Wool	Wine
20	0
16	10
12	20
8	30
4	40
0	50

D. Production Possibilities Frontiers: A Production Possibilities Frontier(PPF) represents the combinations of two goods an economy can produce given its current resources and technologies. Any point within (to the left and below) the frontier is *feasible*, any point outside (to the right and above) the frontier in *not obtainable*, and any point on the frontier is both *feasible* and *technically efficient* (uses all the resources available with no wasted resources). Note that all points on the frontier are equally efficient. There is nothing inherent about the frontier that suggests where on the frontier is best for a particular economy to produce. The following two graphs depict the trade-offs both countries face when deciding how much wool and wine to produce for their own consumption.

a. Figure 1: Great Britain's Production Possibilities Frontier



b. Figure 2: Spain's Production Possibilities Frontier



E. Opportunity Costs: The cost of something is what you give up to get it. In this example we can consider the cost of wool in terms of the amount of wine a country must give up to increase its production of wool by one metric ton. Likewise, we can consider the cost of wine to be the amount of wool each country must give up to produce one more kiloliter of wine.
   a. Cost of Wool:
      i. Great Britain: Imagine Great Britain is currently producing no wool and 25 kiloliters of wine. If it gives up 5 kiloliters of wine production this year it can divert those resources and produce 20 metric tons of wool. To calculate the price of one metric ton of wool we take the ratio of the wine given up divided by the wool gained:

         5 kiloliters of wine/20 metric tons of wool = 0.25 kiloliters of wine per metric ton of wool. That is, the opportunity cost of producing one metric ton of wool for Great Britain is the 0.25 kiloliters of wine it must forego to produce it.

         If the PPF is presented as a straight line this relationship will be constant throughout the PPF. If the PPF is presented as a curve, however, the relationship will differ between different points.

      ii. Spain: If we consider the same problem for Spain we see that if Spain is currently producing no wool and 50 kiloliters of wine it can produce 4 metric tons of wool if it gives up 10 kiloliters of wine production. If we repeat the process from above we see:

10 kiloliters of wine/4 metric tons of wool = 2.5 kiloliters of wine per metric ton of wool. Or, the opportunity cost of producing one metric ton of wool for Spain is 2.5 kiloliters of wine.

b. Cost of Wine: We can repeat the exercise but instead consider each country as it attempts to increase its wine production.
    i. Great Britain: Start at the point where Great Britain produces no wine and 100 metric tons of wool. To get 5 kiloliters of wine it must give up 20 metric tons of wool.

    20 metric tons of wool / 5 kiloliters of wine = 4 metric tons of wool per kiloliter of wine. Or, the opportunity cost of one kiloliter of wine for Great Britain is 4 metric tons of wool.

    ii. Spain: Start at the point where Spain produces no wine and 20 metric tons of wool. To get 10 kiloliters of wine it must give up 4 metric tons of wool.

    4 metric tons of wool / 10 kiloliters of wine = 0.40 metric tons of wool per kiloliter of wine. Or, the opportunity cost of one kiloliter of wine for Spain is 0.40 metric tons of wool.

c. Comparative Advantage: Comparative advantage is the ability to produce something at a lower opportunity cost than another producer.
    i. Wool: In the example above Great Britain has the comparative advantage at producing wool. Its opportunity cost for each metric ton of wool it produces is 0.25 kiloliters of wine. Spain must give up 2.5 kiloliters of wine for each metric ton of wool it would like to produce.

    ii. Wine: In the example above Spain has the comparative advantage in producing wine. Its opportunity cost for each kiloliter of wine it produces is 0.40 metric tons of wool. Great Britain must give up 4 metric tons of wool production for each kiloliter of wine it would like to produce.

    iii. Notice that with linear PPFs (and two-good models) it will always be the case that if one economy or country has the comparative in one good the other economy or country will have the comparative advantage in the other good.

F. Trade: Two Views – There are two different ways to look at the potential gains to be had if the two economies trade.
   a. Combined PPFs - or- Global PPF: One way to see that the two economies can be better off with trade is to combine their Production Possibilities Schedules and their Production Possibilities Frontiers.
      i. Combined Production Possibilities Schedules – Start by imagining that the two economies come together and both economies choose to produce all wool. Great Britain will produce 100 metric tons of wool and no wine and Spain will produce 20 metric tons of wool and no wine. Together, they produce 120 metric tons of wool and no wine:

Great Britain and Spain Joint PPS With Trade	
Wool	Wine
120	0

Now, if they want some wine it makes the most sense for Spain to produce it because it has a lower opportunity cost. So, 10 kiloliters of wine will cost 4 metric tons of wool:

Great Britain and Spain Joint PPS With Trade	
Wool	Wine
120	0
116	10

We can continue in this way until Spain is producing no wool:

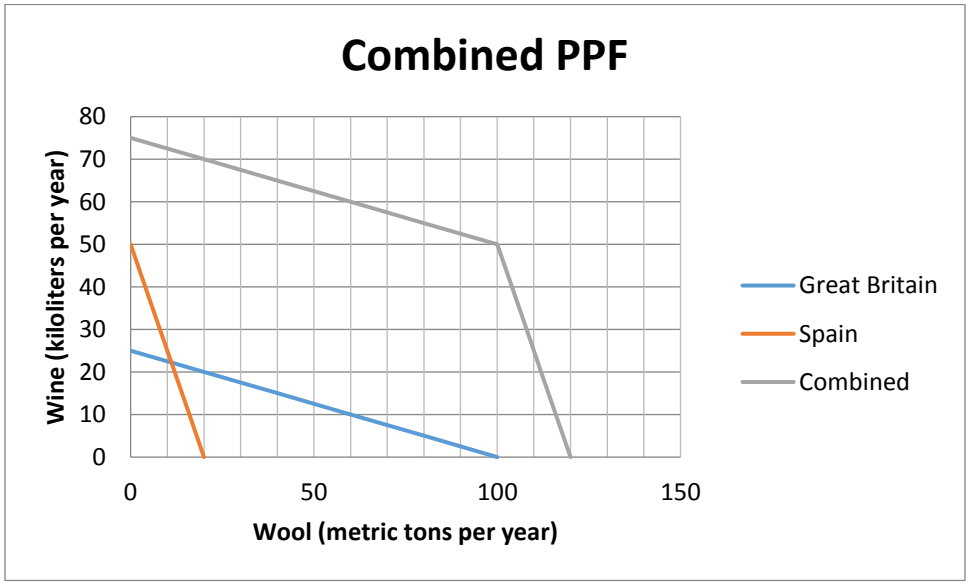
Great Britain and Spain Joint PPS With Trade	
Wool	Wine
120	0
116	10
112	20
108	30
104	40
100	50

At the point where Great Britain is producing all wool and Spain is producing all wine we say that the two economies are completely

Specializing. They are producing only the good in which they have a comparative advantage. Note, that there is nothing in this example that suggests that the two economies *should* choose this outcome. We would have to know more about what the citizens of each economy would like to consume to answer that question.
Now, any additional wine will have to be produced by Great Britain:

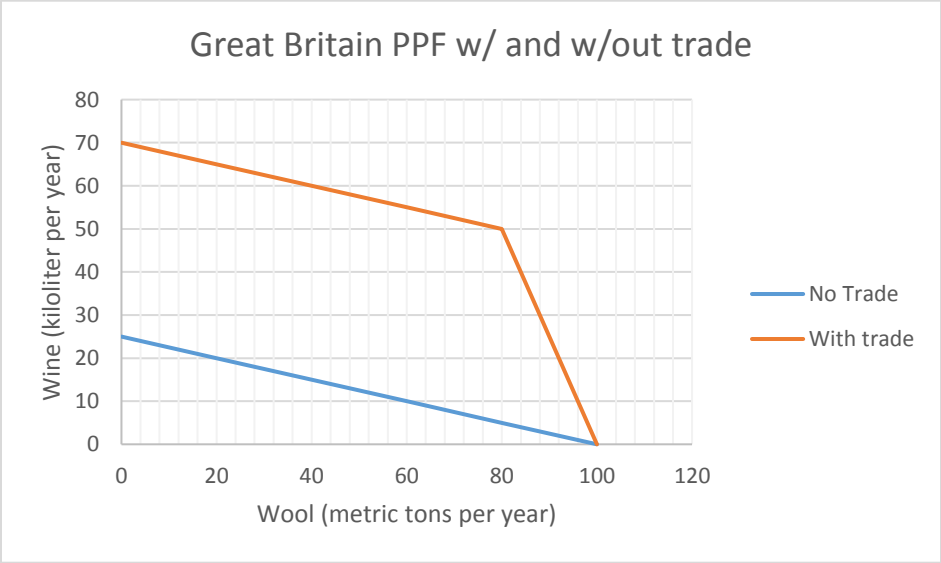
Great Britain and Spain Joint PPS With Trade	
Wool	Wine
120	0
116	10
112	20
108	30
104	40
100	50
80	55
60	60
40	65
20	70
0	75

ii. Joint PPF – Showing the combinations that are possible to produce if both economies work together. It should be apparent that the combined production is more than just the sum of the two countries.



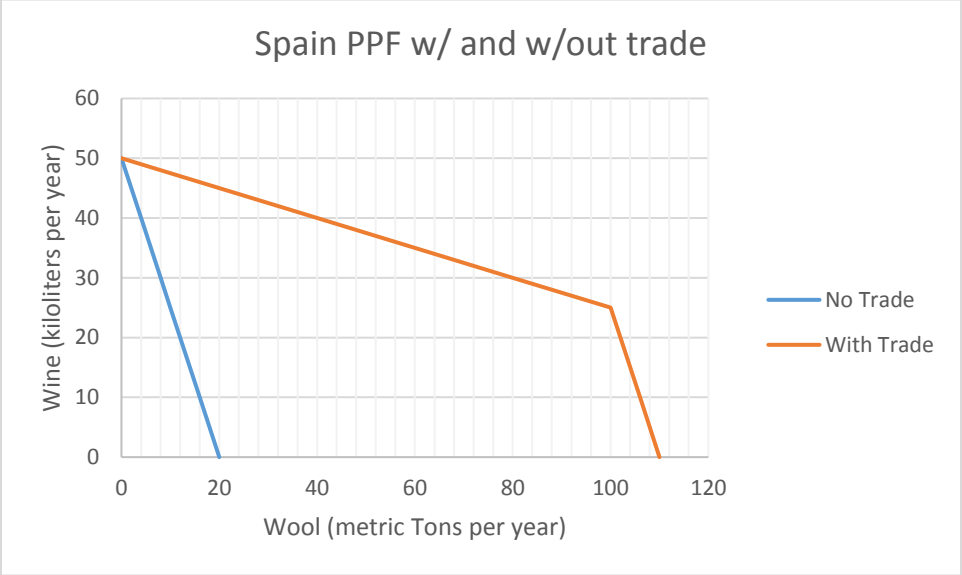
b. Considering Exchange Possibilities – Another way to get a feel for the potentials for trade is to consider the rate at which each country would be willing to trade one good for the other. While there is no way to determine (without additional information) what the rate at which each country will trade their commodity for the other country's commodity, we can determine the best possible scenario for each economy.

i. Great Britain: Great Britain will only trade if it can get wine from Spain. Spain will be willing to trade up to 2.5 kiloliters of wine for each metric ton of wool they received up to 50 kiloliters of wine. Great Britain is happy to trade as long as each kiloliter of wine costs less than 4 metric tons of wool. The PPF below shows all the possible combinations of wool and wine that Great Britain may be able achieve with trade depending on the price it negotiates for wine. The PPF with trade represents the available combinations of wool and wine at a price of 2.5 kiloliters of wine per metric ton of wool (the price most advantageous for Great Britain). The area between the original PPF and the PPF with trade shows the potential gains to Great Britain. The kink in the PPF with trade represents the point at which Great Britain has purchased all of the wine that is available from Spain (moving from right to left). Any additional wine will have to be produced domestically at the higher opportunity cost of 5 metric tons of wool per kiloliter of wine.



ii. Spain: Spain will only trade if it can get wool from Great Britain. Great Britain will be willing to trade up to 4 metric tons of wool for

each kiloliter of wine they received up to 100 metric tons of wool. Spain is happy to trade as long as each metric ton of wool costs less than 2.5 kiloliters of wine. The PPF below shows all the possible combinations of wool and wine that Spain may be able achieve with trade depending on the price it negotiates for wool. The PPF with trade represents the available combinations of wool and wine at a price of 4 metric tons of wool per kiloliters of wine (the price most advantageous for Spain). The area between the original PPF and the PPF with trade shows the potential gains to Spain.



G. Vocabulary:

Opportunity cost – what a producer or consumer gives up in order to produce or consume one more unit of a different good or service.

Production possibilities schedule (PPS) – A table that depicts the possible combinations of two goods or services that a producer or country can produce given its current resources and technology.

Production possibilities frontier (PPF) – A graph that depicts all of the combinations of two goods or services that a producer or country can produce, can produce efficiently, and cannot produce given its current resources and technology.

Comparative advantage – The ability to produce a good or service at a lower opportunity cost than another producer or country.

Absolute advantage – The ability to produce more of a good or service than another producer or country.

Specialization – Producing only the good or service in which you have a comparative advantage and trading to acquire the other good or service.