

Suppose you have two countries, Home and Foreign. Assume there are only two factors of production, energy (E) and capital (K). Home is relatively abundant in energy, and Foreign is relatively abundant in capital. Both countries produce only two goods, green (QG) products which are capital-intensive and brown (QB) products which are energy-intensive. Technologies, factor productivities, and preferences are identical across countries. Output prices are P_G and P_B , the return on capital is R_K , and the price of energy is P_E . Factors are imperfect substitutes for each other, but in the long run are perfectly mobile between sectors.

1. With QG on the horizontal axis, draw the PPFs for Home and Foreign. Using indifference curves, show the autarky production points (label it A).
2. Under autarky, which country has the highest P_G/P_B ratio? Which country has the highest factor price ratio (R_K/P_E)? In which country will the G and B sectors use the highest E/K ratios?
3. Is it possible that under autarky the Home country's green industry uses relatively more energy than the Foreign country's brown industry?
4. Under free trade in the long run, what would happen to the P_G/P_B , R_K/P_E , and E/K ratios in each country?
5. Show your answers to #2, #3, and #4 using a three-axis (P_G/P_B , R_K/P_E , and E/K) graph.
6. In the short run, assume that energy is mobile between sectors but that capital is specific to each product. In the short run, how would free trade affect Home's return on capital in each industry, and how would it affect the price of energy?
7. On your original PPFs, show how free trade affects the production (Q) and consumption (C) combinations, and show that it improves average welfare in both countries.