

Homework 1 (due on May 4)

Question 1: Let Germany have a labor force of 80 and France of 60. Suppose both countries produce wine and cars according to the following unit labor requirements:

	Germany	France
wine	$a_w^G = 2$	$a_w^F = 1$
cars	$a_c^G = 8$	$a_c^F = 10$

Further suppose that the representative German as well as the representative Frenchman both have the utility function $U^i(Q_w^i, Q_c^i) = Q_w^i Q_c^i$ where $i = G, F$.

- Depict the PPF for both countries and label the intercepts as well as the slope (include their exact values, pls). Which country has the comparative advantage in producing wine/cars?
- Suppose each country wanted to go it alone. What would be the quantities produced (= consumed) and the utility levels obtained under autarky? (A little help: recall from micro that in the consumption optimum $MRS = U_{Q_c}/U_{Q_w} = p_c/p_w$.)
- Now consider free trade. Depict the world's relative supply function (again, pls label and provide numbers). What is the world's free trade equilibrium relative price? What quantities does each country produce, how much do they import/export? What are the utility levels obtained? How high are their respective wages?
- Consider a third country: Spain, which has a labor force of 45 and unit labor requirements $a_w^S = 1$ and $a_c^S = 15$. Repeat c) for all three countries. Does Spain gain from trade? What about the other two?

Question 2: The Dornbusch/Fischer/Samuelson Model.

- Assume $A(z) = 1.5 - z$, constant uniform budget shares (i.e. $b(z) = b^*(z) = 1 \forall z \in [0, 1]$), and equal labor forces ($L = L^*$). Using the balanced trade condition, calculate the equilibrium relative wage and the subsets of the unit interval of goods produced respectively by the home and the foreign country.
- Suppose the size relation were different, i.e. $L \neq L^*$. Show formally how variations in L/L^* affect the cut-off $\tilde{z}$, and hence the ranges of products produced by home and foreign — explain!
- Assuming iceberg-style trade costs of $(1-g)$ percent, determine the condition(s) for which goods are produced in either country. Conceptionally depict these ranges on the unit interval of goods.

Question 3: Suppose that the production functions of sector 1 and 2 are $Q_1 = L_1^\alpha K_1^{1-\alpha}$ with $1 > \alpha > 0$ and $Q_2 = L_2^\beta K_2^{1-\beta}$ with $1 > \beta > 0$, respectively.

- a) Which additional assumption about α and β do you need to make, so that good 2 is capital intensive, that is, uses the higher capital/labor ratio for a given relative factor price? Show formally that good 2 is capital intensive if your assumption holds.
- b) Derive the corresponding unit cost functions and explain why unit costs equal output prices in equilibrium. Then use these equalities to express factor prices as functions of output prices.
- c) Using your results from b) and the same assumptions as in a), explain factor price equalization and formally verify the Stolper-Samuelson result.