

## Homework 1

due on Friday Oct 29

**Problem 1:** Consider two countries, Turkey and Greece. Suppose both produce wine and clothes according to the following unit input requirements:

	Turkey	Greece
wine	$a_w^T = 4$	$a_w^G = 4$
clothes	$a_c^T = 16$	$a_c^G = 1$

The Turkish labor force is 64, and in Greece it is 32. Furthermore, assume that the representative consumer in both countries has the utility function  $U(x_c, x_w) = x_c^b x_w$ , where the exponent  $b$  is a positive parameter.

- a) Depict both countries PPF and construct the relative supply schedule, carefully labelling your diagrams. Which country has the comparative advantage in which commodity?
- b) Suppose  $b = 1$ . Derive the relative demand function and depict it in the same diagram as relative supply from above. What is the equilibrium relative price? Quantify each countries' imports and exports.
- c) Derive the critical value(s) of  $b$  above/below which only one country is completely specialized while the other produces both goods. How much does each country gain from trade in such a situation?

**Problem 2:** Suppose that the production functions of sector 1 and 2 are  $Q_1 = K_1^{0.3} L_1^{0.7}$  and  $Q_2 = K_2^{0.6} L_2^{0.4}$ , respectively.

- a) Determine formally which of the two goods is capital intensive, that is, uses the higher capital/labor ratio for a given relative factor price.
- b) Derive the corresponding unit cost functions and explain why unit costs equal output prices. Then use these equalities to express factor prices as functions of output prices.
- c) Using your results from b), explain factor price equalization and verify the Stolper-Samuelson result.

**Problem 3:** A country's output vector is  $X = (2, 2, 1)$ , the world's output vector is  $X^w = (55, 100, 110)$ , the price vector is  $p = (4, 4, 3)$ , and the commonly used input output coefficients are

$$\begin{pmatrix} 1 & 2 & 1 \\ 1 & 1 & 1 \\ 2 & 1 & 1 \end{pmatrix}$$

where the first row describes labor coefficients, the second row describes land coefficients, and the third row describes capital coefficients. All countries have identical homothetic preferences and balanced trade.

- a) Describe the country's pattern of commodity trade.
- b) Describe its pattern of trade in factor content.
- c) What are the equilibrium factor prices?

**Problem 4:** Carry out the empirical exercises that you find at the end of chapter 2 in the Feenstra book. You can download the data and stata do files at this URL:

[www.econ.ucdavis.edu/faculty/fzfeens/empirical/Chapter-2.zip](http://www.econ.ucdavis.edu/faculty/fzfeens/empirical/Chapter-2.zip)