UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: **ECON4415 – International Trade**

Date of exam: Friday, December 16, 2011 **Grades are given: January 5, 2012**

Time for exam: 2:30 p.m. – 5:30 p.m.

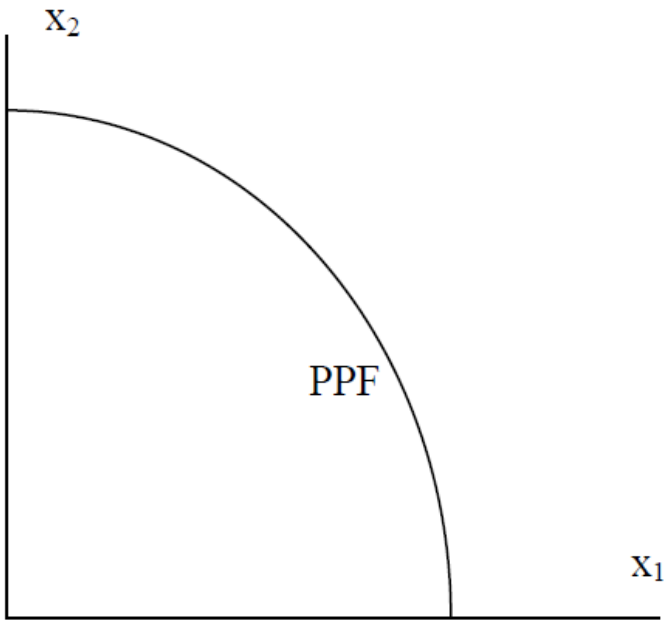
The problem set covers 3 pages

Resources allowed:
- No resources allowed

The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

Problem 1. (50 points)

a. In the Heckscher-Ohlin model, the production possibility frontier is bowshaped from the origin. It can look like the figure below:



Explain the construction of this figure.

b. How are wages and returns to capital determined in an economy with two factors of production, labour and capital, and with constant returns to scale, increasing and concave production functions?

c. Consider two economies characterized by the production technologies described in b.

Assume that the two countries are populated with one representative consumer with identical and homothetic utility functions. Assume that the two economies are identical in all respects, except that one of the two countries has more capital than the other country. Explain how product prices, wages and returns to capital differ between the countries if they do not trade with each other.

d. Explain how product prices, wages and returns to capital change if there is free trade between the two countries.
e. What is the Rybczynski theorem? Explain the economic mechanisms that are described by the theorem.

Problem 2. (50 points)

a. Consider the following utility function:

$$U(q_1, q_2, ..q_N) = \left(\sum_{i=1}^{N} q_i^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \qquad \sigma > 1$$

Assume that an economy is populated with a mass L of workers who work, consume and own the firms. Their preferences for the available varieties of the consumption goods are given by the above utility function. The wage rate is denoted by w.

Show that maximization of the above function result in the following demand functions:

$$q_j = \frac{p_j^{-\sigma} wL}{P^{1-\sigma}}$$

where the price index, P, is given by:

$$P = \left(\sum p_i^{1-\sigma} \right)^{\frac{1}{1-\sigma}}$$

b. The demand elasticity for a producer of a single variety is $-\sigma$. Assume that producers have fixed costs and variable costs. The use of labour in production of variety j is therefore given in the first equation below. Total costs are given in the second equation.

$$l_j = f + bq_j$$
$$C_j = w(f + bq_j)$$

Set up an expression for profits for the producer of variety j. Find the optimal price for each firm.

c. Assume that there is free entry into the market so that firms enter as long as profits are positive. Derive the resulting produced quantity for each firm.
d. Assume that there is full employment of the L workers in the economy. Derive the resulting number of firms. This is also the equilibrium number of available varieties in the economy.

e. What are the effects of trade between two similar economies described by the above preferences, production technologies and market structure?
f. Now, assume that the two countries differ in size. Also assume that there are transportation costs in trade between the countries. Explain why wages will be higher in the largest country.