# Geographical Economics Winter 2012/2013
## Assignment 3: Due January 29th 2013

General information

This problem set MUST be solved individually. Each student MUST turn in the copy of the solution on paper support. Do not forget to identify at the beginning of each page. There are not specific requirements about the format (font, lines etc) of the document students are expected to turn in.

The solution of this assignment MUST be turned in at the beginning of the class.

No delay or extra time will be granted. Exercise 1 and 2 score 3 points each and exercises 3 scores 4 points

1. Suppose that chemical X is manufactured using a raw material B that is available from a location called the "mine". Production of one ton of X requires 1/3 of a ton of B. A firm called X Enterprises, which has a contract to deliver 30 tons of X to a location called the "market", is trying to decide where to locate its plant. The mine and the market are 50 kilometres apart. Overland shipment of both X and B costs 2€ per ton per km. shipped. However, additional costs must be incurred because a river passes between the mine and the market, and the river has no bridge. Goods must be loaded onto barges to cross the river, which is located 16 miles from the mine. Barge operators charge 1€ per ton of X shipped across the river. However, since the input B is highly toxic when mixed with water, barge operators must charge an extremely high price to transport B across the river. This price defrays the cost of insurance that the operators must carry to meet liability claims should they accidentally pollute the river with their cargo. The cost of shipping one ton of B across the river is 195€.

a) Using the above information, find the transport-cost-minimizing location for X Enterprises. The answer can be found by computing transport costs at four locations: mine, market, mine side of the river, and market side of the river. Assume that the width of the river is negligible, so that it can be ignored.

b) Illustrate your results in a drawn diagram like those presented in the slides showing the examples of bats and bottling of beverages. Plot the procurement costs at the same four locations as in (a) and then connecting the dots. Similarly plot the delivery cost at the four locations, and then connect the dots to generate the delivery cost curve. Then, plot the total shipping-cost curve by adding the input and output shipping costs at each of the four locations, plotting the points and connecting the dots. Using the diagram, identifying the best location for X Enterprises, which should be the same as your answer in (a).

c) Explain your results intuitively

d) Suppose that a bridge were built across the river, which would eliminate the cost of crossing it. Repeat (a), (b), and (c) under this assumption

2. A firm produces an output C for a market $M_C$ by using two inputs (A and B) that are produced in two different places $M_A$ and $M_B$. Suppose that the firm uses $M_A$ intensively and that the government implements a wage subsidy for the firms in $M_B$. Explain how this will change the location decision of the firm in the case of a technology that allows input substitution. (Use the assumption of the triangle with a fixed distance to the market like in the case of Moses)

3. Download the following article:
   Kim, S. (1995) "Expansion of Markets and the Geographic Distribution of Economic Activities: The Trends in U. S. Regional Manufacturing Structure, 1860-1987", *The Quarterly Journal of Economics*, Vol. 110, No. 4., pp. 881-908.

   Explain the following points in no more than three pages:
   - The objective and the empirical strategy of the author
   - Results
   - Discuss the strategy followed with respect to the treatment of "marshallian externalities"
   - Could you provide an alternative explanation to the evolution of manufacturing concentration in the U.S. using "new economic geography"